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A National Environmental/Energy Workforce Assessment. Connecticut

National Field Research Center, Inc, Iowa City, Iowa

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A National Environmental/Energy Workforce Assessment

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16. ABSTRACT

This study is one of 70 volumes assessing the workforce needs (manpower needs) for pollution control and abatement in the United States for the five-year period of 1976 through 1981. Seven fields for pollution control — air, noise, pesticides, potable water, radiation, solid waste, and wastewater — are analyzed, together with energy-related programs currently accentuated by the national effort to solve energy supply problems.

Designed as Phase I of a three-phase program, the complete assessment includes the following volumes: one each for the 50 states, the District of Columbia, Puerto Rico, and the Virgin Islands; one for each of the ten EPA regions; a one-volume National Abstract; a volume on National Legislation; a volume on Business and Industry; and a four-volume National Summary. The information was gathered through extensive personal interviews with responsible federal, state, and local officials in every state; with officials of representative private industrial and commercial firms; and with representatives of national industrial and trade organizations.

Phase II will develop a broad national inventory of the entire range of post-secondary and higher education training offered in the pollution control and energy areas cited above, and Phase III will offer demonstrations for curriculum changes or modifications which appear necessary to assure an adequate and properly trained national environmental/energy workforce.

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for

CONNECTICUT

Conducted by:

NATIONAL FIELD RESEARCH CENTER, INC

Under Grant from:

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ENVIRONMENTAL PROTECTION AGENCY

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Finally, appreciation is extended to Mr. Louis Proulx of the Office of Noise Control for his contribution to this report.

PREFACE

This report presents existing workforce levels, training programs, and career potentials and develops staffing level projections (1976 - 1981) based on available information for the State of Connecticut in the environmental pollution control areas of air, noise, pesticides, potable water, radiation, solid waste, waste water, and energy. This study was carried out for the United States Environmental Protection Agency by National Field Research Center of Iowa City, Iowa.

The information and data presented in this report were compiled in large part from extensive interviews with professionals working in the respective areas and were supplemented by telephone surveys and research.

FOREWORD

The material herein contains the information and data collected for eight individual pollution control inventories conducted for Connecticut. The format includes workforce profiles, projections, growth and career potential for each of the areas investigated. Growth projections are necessarily based on best professional estimates developed from available information and represent what are felt to be realistic figures by experts in the respective areas. The pollution control areas considered by this study are as follows:

Air

Noise

Pesticides

Potable Water

Radiation

Solid Waste

Waste Water

Energy

National Environmental Energy Workforce Assessment

Phase I

CONNECTICUT

State Summary

I. AIR

The Air Compliance Unit of the Connecticut Department of Environmental Protection is responsible for implementing the state provisions of the Clean Air Act of 1970. The program is primarily staffed with air pollution control engineers and technicians, field inspectors, and environmental protection maintainers. The air program has decreased in staffing in one year from 134 full-time personnel to the current level of 104.

For fiscal year 1978, the program is requesting 26 positions to replace some of those lost during 1976. Most of those hired will probably be air pollution control engineers.

The most promising area for the development of new careers will be in the non-degreed vocational workforce. EPA has funded a program in Connecticut to incorporate motor vehicle testing techniques into vocational high school curriculum. Currently, Connecticut has a program which will address the problem of motor vehicle air pollution called the Connecticut Transportation Control Plan. The mandatory inspection and maintenance of emission control equipment, if implemented, should result in a significant demand for non-degreed inspection and maintenance personnel. It is hoped that when inspection and maintenance plans become effective, a trained workforce will be available for immediate implementation of the plan through a training program targeted for vocational education high schools.

II. NOISE

The Noise Compliance Unit of the Department of Environmental Protection (DEP) is authorized to develop controls on environmental noise through regulation and restriction of the use and operation of stationary noise sources. Upon request, consultant services are provided to officials from communities who are revising or developing noise ordinances. Local noise control laws must be approved by and be consistent with regulations adopted by DEP. The Noise Control Unit is currently developing standards and regulations for noise abatement and control within the State of Connecticut. These should become effective some time in 1977.

An Advisory Committee under the auspices of DEP works with the program through reviewing options available to the state for noise strategies. The Committee also assists in the development of rules and regulations pertaining to noise control. It is composed of an engineer and an environmental analyst at the present time.

Program administrators stated that the present composition of the Noise Compliance Unit is adequate to meet projected needs for the next few years. On the local level, once regulations are in effect, it is anticipated that between 20 and 25 municipalities will implement some type of formal program, with the largest program consisting of one full-time employee. It is also expected that design and acoustical engineers will be needed by the state's private sector to ensure compliance.

III. PESTICIDES

The pesticide program of Connecticut's Department of Environmental Protection (DEP) is responsible for the implementation of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) as amended. The Pesticide Compliance Unit of DEP's Environmental Quality Division has four people employed for the pesticide program. They include an assistant director, an environmental analyst, an inspector, and a clerk.

There exists no significant projected pesticide workforce increases in Connecticut at the state level since a state commercial applicator training program was already operating prior to FIFRA requirements. In fact, five year estimates for the program show that it expects to pick up only one additional inspector, making a total state pesticide workforce in 1981 of five.

New career openings in the private sector are unknown and will not be readily determinable until the present workforce is certified, thus defining the scope of the labor force. Attrition rates and new entries can then be determined on an yearly basis to provide some idea of the growth in this sector.

IV. POTABLE WATER

The Safe Drinking Water Act (SDWA) enacted in 1974 will be implemented through the Water Supplies Section of the Connecticut State Health Department. The Water Supplies Section is staffed with engineers, chemists, a laboratory technician, and a sanitarian. There are presently 30 certified water treatment plant operators in Connecticut. Only chief operators are required to be certified.

Connecticut is expected to assume primacy for implementing the provisions of the Safe Drinking Water Act within the next five years. Its success in doing so depends, in part, upon the extent of EPA's commitment to provide substantial support to the state's water supply program.

Pursuant to the acceptance of SDWA primacy, it is anticipated that over the next five years workload increases will occur as smaller towns in the state become unable to meet interim regulations due to the lack of resources needed to finance necessary corrective alterations to existing facilities and systems. And, as a consequence of increasing regulatory demands, the number of certified treatment plant operators is expected to double over the next five years.

V. RADIATION

The radiation control program for Connecticut is located within the Environmental Quality Division of the Department of Environmental Protection. On June 1, 1976, the transportation of radioactive materials in large quantities became regulated by the state through a permit system operated by the Connecticut Department of Transportation. The Radiation Compliance Unit is responsible for spot checks en route.

The Radiation Control Unit is staffed with six persons which include two radiation control physicists, two technicians, one typist, and a director. The State Department of Health performs routine laboratory work for the unit. In Connecticut, altogether, it has been estimated that there are about 40 individuals (technical and professional, public and private) engaged in environmental radiation monitoring.

Over the next five year period, the Radiation Compliance Unit expects to grow by the addition of at least three radiation control physicists. If public awareness continues at the present level, the entire state (public and private) environmental monitoring workforce could double by 1982. In the private sector, increased environmental radiation monitoring activities by colleges and universities within the state are likely to result in an increase in radiation control research careers.

VI. SOLID WASTE

The Office of Solid Waste Management, within the Department of Environmental Protection (DEP), regulates the disposal of all solid waste generated in Connecticut. State legislation also created the Connecticut Resource Recovery facility construction plan.

The Office is currently staffed with 19 individuals, in addition to a director, and represents the largest solid waste workforce in Region I. Engineers make up the bulk of the Office's workforce, although there are also geologists, biologists, and field inspectors on its staff.

The Connecticut Resource Recovery Authority is operating with 15 personnel who have backgrounds in planning, financing and engineering. Currently, there are two engineers on the staff who are responsible for maintaining liaisons with the contractors and/or communities establishing resource recovery facilities.

The impact of the new Resource Conservation and Recovery Act of 1976, PL 94-580, at the state level will probably be concentrated in the area of hazardous waste management. Officials of the Office of Solid Waste Management speculate that five or more professional positions will be added to the current staffing level within the next two years, with a subsequent leveling off thereafter. More than likely these individuals will be involved in developing Connecticut's hazardous waste management program.

VII. WASTEWATER

The Water Compliance Unit of Connecticut's Department of Environmental Protection (DEP) is responsible for the control of all industrial and municipal water pollution, as well as oil and chemical handling. The Federal Water Pollution Control Act (FWPCA) is administered by EPA and Connecticut through two programs provided by the act, a construction grant program and a discharge permit program.

The Water Compliance Unit is staffed with sanitary engineers, chemists, sanitarians, field inspectors, and environmental protection specialists. Within Connecticut there are presently 615 certified wastewater treatment facility operators as well as 300 uncertified operators.

If the fiscal austerity measures of the state do continue and additional monies are not forthcoming from EPA, it appears that little, if any, staff growth will occur over the next five years. Field research suggests, however, that the number of certified municipal wastewater treatment system operators will increase by about 100 per year over the next five years.

It appears that little career potential exists in the state agency wastewater program. There will be some job opportunities in the state program for recent engineering graduates, but the high rate of turnover for entry-level engineers suggests that this job is not a long-term career choice for many young engineers. Any potential significant growth in the near future appears to be for treatment plant operators.

VIII. ENERGY

New England electric utilities are heavily dependent upon petroleum and nuclear energy for electrical power generation. Approximately 60 percent of the regional electrical power is petroleum generated and 24 percent is supplied by nuclear fueled power plants. Connecticut produces about one half of the nuclear electrical power generating capacity for the region (2,055 megawatts of 4,204 generated).

Energy conservation must receive priority emphasis in Connecticut for the short- and mid-term energy planning efforts. Toward this goal, the Department of Planning and Energy Policy was established in 1975 to replace and expand the responsibilities of the Connecticut Energy Agency and to consolidate those responsibilities with those of the former planning section of the Planning and Budgeting Division of the Department of Finance and Control.

The Department is responsible for energy policy research and development of a statistical support base for population and energy forecasting. The Department employed 43 persons in 1976,and is expected to reduce staffing to 37 in 1977.

STATE OF CONNECTICUT - SUMMARY

National Environmental/Energy Workforce Assessment
Pollution Control & Abatement Personnel
Projected Workforce Requirements (1976-1981)

Environmental Area	1976	1977	1978	1979	1980	1981	%/annum growth (average)
AIR[1]	116	--	--	--	--	--	N/A
NOISE[2]	2	--	--	--	--	--	N/A
PESTICIDES[3]	2045	(5004)	--	--	--	(5005)	N/A
POTABLE WATER[4]	46	--	--	--	--	76	N/A
RADIATION[5]	40	--	--	--	--	45	N/A
SOLID WASTE[6]	10	--	(15)	--	--	--	N/A
WASTEWATER	991	--	--	--	--	--	N/A
ENERGY[7]	43	37	--	--	--	--	N/A
TOTALS	3293	--	--	--	--	--	N/A

[1]The above includes 104 state agency personnel and 12 individuals at the local level. The private sector effort was not discernible.

[2]The above includes only state agency personnel.

[3]The above includes 4 DEP personnel and 2041 certified pesticide applicators. Workforce figures for the Connecticut Extension Service and the Tree Protection Examining Board are not included.

[4]The above includes 16 agency personnel and 30 certified treatment plant operators.

[5]The above includes an estimated 40 individuals (technical and professional, private and public) engaged in environmental monitoring.

[6]The above includes only state agency personnel.

[7]The above includes only state agency personnel.

EDUCATION

The Hartford Graduate Center at Hartford has an Engineering Science Program with an emphasis in Environmental Science and Technology leading to an M.S. degree. A total of thirty semester hours are required to complete this program which began in 1973. The courses are taught by two adjunct professors and seven lecturers in Environmental Science. Current (1976) enrollment is 25 and five persons graduated from the program in that year. Five persons were placed in jobs from the program and additional graduate work in this field is not available at the Hartford Graduate Center.

The Northwestern Connecticut Community College at Winsted has an Environmental Technology Program leading to an associate of science degree. A total of 60 semester hours are required in order to complete this program of study. The courses are taught by one professor who has a Ph.D. Current (1976) enrollment is 25-30 and seven students graduated in 1976. There are two options available: the General and Community Environmental Health Option and the Water Hygiene Option.

LEGISLATION

The environmental/energy legislation for Connecticut was obtained by request from various agency personnel and through various library references. Summaries of the legislation deemed most relevant to the eight subject areas of the workforce assessment were prepared, and are included in the respective state reports. The following list of laws represents virtually all environmental legislation for the state. Only certain of the following laws were summarized; the list is presented to show, by title, the kinds of laws which have been enacted.

Environmental Policy Act

Environmental Protection Act

Air Pollution Control Law

Noise Pollution Control Act

Vehicular Noise Control Act

Solid Waste Management Act

Solid Waste Management Services Act

Clean Water Act

Inland Wetlands and Water Courses Act

National Environmental Energy Workforce Assessment

Phase I

CONNECTICUT

State Report

STATE PROFILE

Connecticut, one of the six New England states, covers 5,009 square miles. It is the third smallest state and extends roughly 100 miles from east to west and 50 miles from north to south. Connecticut is an integral part of the great eastern seaboard urban-industrial complex. The population of approximately 3,100,000 is expected to exceed 3,700,000 by 1980. Hartford and Bridgeport each have slightly more than 150,000; New Haven, slightly fewer.

The economy is based on the skilled workforce. The 1975 per capita income was $6,854.00; second only to Alaska. Unemployment levels, however, have exceeded the national level since January, 1975. Value added by manufacturing is $7.9 billion annually. The non-farm workforce is broken out below:

Manufacturing	34%
Wholesale and retail trade	19%
Services	16%
Government	14%
Finance, insurance and real estate	6%
Construction	5%
Transportation, communication and public utilities	4%

Items manufactured include helicopters, submarines, aircraft engines, guns, and ammunition; clocks, sewing machines, silverware, and cutlery. All raw materials but sand and gravel must be imported. The last of Connecticut's iron mines closed early this century.

Hartford is a major insurance headquarters; three of the nation's largest insurance companies are based there. The Greenwich-Stamford area has a major concentration of multinational corporation headquarters.

Agriculture has declined in importance in Connecticut since 1870. Now shade grown tobacco is its only farm export. Poultry and dairy products accounted for the majority of the $220 million in farm receipts for 1975; potatoes, fruits and vegetables are also grown. The once-flourishing oyster industry has been devastated by increases in the oysters' natural enemies and by adverse effects of pollution of the coastal waters; some improvement has been noted recently.

Connecticut was originally forested with oak and northern hardwood varieties. It occupies the southern portion of the New England Upland and includes three distinct regions: the Western Upland (part of the Berkshire Hills drained by the Housatonic River); the Central Lowlands formed by the Connecticut River valley which is 20 miles wide in the north and narrows sharply toward the south; and the Eastern Upland with rivers forming the Thames River.

Tourism brings in nearly $500 million a year; the 29 state forests and 85 state parks are heavily used.

The future of Connecticut, in terms of environmental quality, is uncertain. The population is projected to exceed 5,000,000 by the year 2000. Immigration is heavy. Land use planning and economic expansion will be matters of serious debate in the near future.

CONNECTICUT POLLUTION CONTROL AND ABATEMENT AGENCIES

The Connecticut Department of Environmental Protection is the principal state environmental agency. This Department has responsibility for the state's air, solid waste, waste water, radiation, pesticide, and noise programs. The Connecticut Department of Public Health is responsible for potable water programs and also oversees the state's analytical laboratories while the Connecticut Department of Planning and Energy Policy is responsible for all energy programs. The Council on Environmental Quality, the Connecticut Agricultural Experiment Station, and the Power Facility Council also have some environmental pollution and/or energy responsibilities.

The Department of Environmental Protection is divided into two sections with staff units in the Office of the Commissioner and the Division of Environmental Quality. The Office of Planning and Research is the Commissioner's staff unit charged with long-range planning, intradepartmental coordination, and special research activities in the following six program areas: energy, environmental quality, impact analysis and coordination, transportation, land use, and conservation and preservation. The Environmental Quality Division is comprised of eight units, six of which are described below:

1) The Air Compliance Unit is responsible for implementing the Connecticut Air Quality Implementation Plan through the registration of existing pollution sources, a permit system for new pollution sources, monitoring of air pollution levels, and inspection of possible pollution sources. The plan has so far been successful in

bringing industrial sources of pollution into compliance with federally required levels although less success has been had in reducing automotive pollutants. The Air Compliance Unit is divided into the following four sections: Air Monitoring, which operates and maintains Connecticut's ambient air monitoring network, statistically analyzes monitoring data, and prepares air quality summaries; Engineering, which conducts a permit and registration program to fulfill the federal requirements for controlling new and modified sources of air pollutants; Field Operations and Enforcement, which logs and investigates all complaints received; and the Office of the Director, which organizes the operation of the unit, deals with financial matters, and performs planning functions.

2) The Noise Control Unit has been directed by Connecticut law to develop the following: Controls on environmental noise through regulation and restriction of the operation of stationary noise sources; ambient noise standards for stationary noise sources; consultation with state and local government agencies when such agencies adopt and enforce codes, standard, and regulations dealing with noise; and controls on airports and aircraft noise to the extent not preempted by federal law.

3) The Pesticide Compliance Unit provides courses and examinations for persons who wish to be either licensed or re-licensed to apply pesticides in conformance with federal requirements. This unit also registers pesticides, issues permits for aerial or aquatic applications of pesticides, inspects stores, analyzes pesticides, and makes on-site investigations of complaints or accidents involving pesticides.

4) The Radiation Compliance Unit is responsible for regulating the use of sources of ionizing radiation with the aim of reducing the radiation exposure of the general public and workers to the lowest practicable level. This is done through a statewide environmental radiological surveillance program, the maintainance of an emergency radiological assistance plan, and inspection of installations which register use of diagnostic and therapeutic X-ray machines. The surveillance program is designed to detect and identify changes in radioactivity in the environment so appropriate action can be taken to protect public health and safety. The emergency plan is shared with the State Police Department and is designed to provide assistance in evaluation to individuals involved in accidents involving radioactive materials. The installation inspection program is designed to evaluate exposure of the patient, the operator, and individuals in adjoining offices and to assure compliance with state regulations.

5) The Solid Waste Management Unit has the major objective of assuring that solid wastes are processed and disposed of in a manner that will maximize resource recovery, minimize health and environmental problems, and minimize the land required for ultimate disposal

of solid wastes. The unit's activities fall into four major areas: enforcement, through inspections; technical services, through assistance provided by surveys, reviews, inspections, and public education; training, through publications and certifications: and hazardous wastes, through assessments. The ultimate goal of the hazardous waste program is to improve disposal systems and minimize related environmental and health hazards.

6) The Water Compliance Unit is responsible for the control of industrial and municipal water pollution and oil and chemical handling. As required by specific steps of the orders, permit applications, and municipal sewer construction, the staff reviewed the engineering reports and construction plans and specifications submitted for the various municipal, industrial, and private projects. To ensure the proper operation of existing state, municipal, industrial, and private treatment facilities, this unit carries out inspections at sewage treatment plants throughout the state. This unit also includes among it's duties training and certification of municipal sewage treatment plant operators, issuance of terminal licenses and waste oil collection permits, supervision of the cleanup of oil and chemical spills, field inspections of pollution sources, and planning activities.

A spokesman for the Environmental Quality Division recently provided the following observations:

- Since the environmental movement peaked in 1973, federal grants have been cut back and state funds have been limited.
- The Environmental Quality Division is experiencing modest growth and it is estimated that twelve new positions will be added each year. The ratio of professional to clerical staff will remain approximately the same.
- The exact areas of growth within the Environmental Quality Division depend on both environmental needs and government input.
- It is not unusual for Environmental Quality Division employees to leave their jobs to work for industry at approximately 40% higher salaries.
- The Connecticut policy on attrition is that once a position is vacated, that position no longer exists until it is justified again through a rather lengthy process.

- Most applicants for employment are well qualified, although there are not enough jobs for all those who qualify.
- The Environmental Quality Division offers no formal job training for professionals who receive only in-house, on-the-job instruction. Secretaries are provided with state Civil Service courses.

Connecticut's Water Supplies Program, Subsurface Sewage Disposal Program, and Laboratory Services Program, are all in the Environmental Health Services section of the Office of Public Health of the Connecticut Department of Public Health. The Water Supplies Program has jurisdiction cover the quality, adequacy, and safety of public drinking water supply systems which it monitors and inspects. The Subsurface Sewage Disposal Program assists local health departments in the enforcement of subsurface sewage disposal regulations. Among other services provided by the Laboratory Services Program, the chemical laboratory unit provides services for regulatory agencies controlling air pollution, radiological health and occupational health exposure.

The Connecticut Department of Planning and Energy Policy is charged with overall responsibility for formulating state energy policy and conservation efforts, implementing Federal energy-related programs, and providing staff support to the Connecticut Energy Advisory Board. This Board has the responsibility for filing an annual report with the Governor and General Assembly which contains energy supply and demand forecasts.

The Council on Environmental Quality is charged with providing the following: an annual report to the Governor on the status of

Connecticut's natural environment; environmental assessments of the construction activities of state agencies; and a mechanism for receiving and investigating citizen complaints pertaining to the environment. The Connecticut Agricultural Experiment Station conducts some of its research on pesticides and water pollution. The Power Facility Evaluation Council is responsible for providing an orderly process for balancing the need for adequate and reliable public services, including protecting the environment of the state.

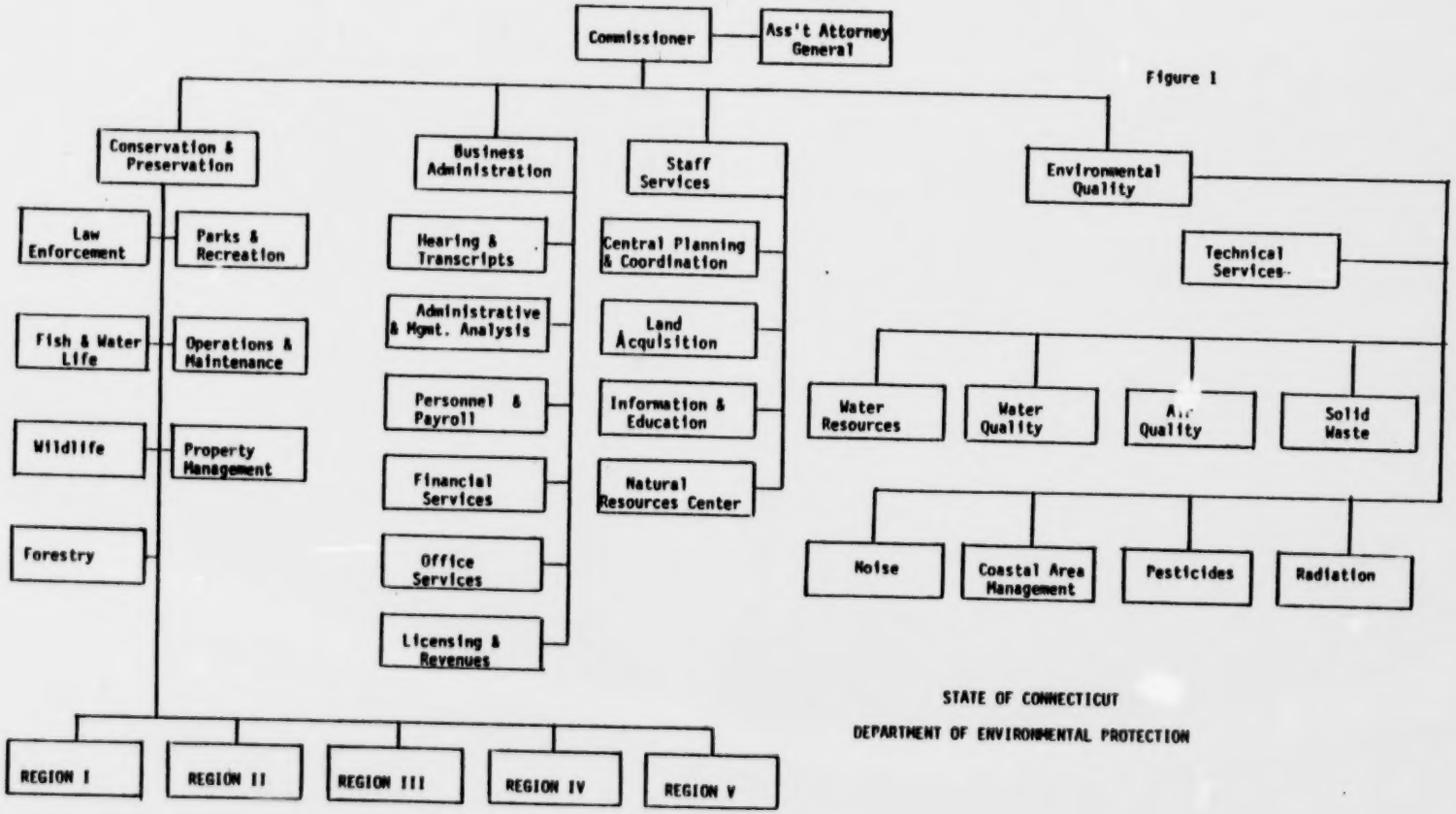


Figure 1

STATE OF CONNECTICUT

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Pollution Control and Abatement Programs

I. AIR

A. Introduction

The Air Compliance Unit of the Connecticut Department of Environmental Protection (DEP) is responsible for implementing the state provisions of the Clean Air Act of 1970 in Connecticut. The Department maintains a timetable for attainment of ambient air quality standards and regulates sources of air pollution accordingly. DEP has the following legal powers:

- to adopt standards to achieve the national clean air goal by 1975.
- to prevent the construction of any new facilities that would violate those standards.
- to inspect existing sources of pollution
- to require source owners to install any necessary pollution controls and monitor their own equipment
- to declare an alert if pollution levels get dangerously high and take measures to lower pollution levels at such times

DEP also maintains air monitoring equipment throughout the state to evaluate progress and to plan future air strategies.

Within Connecticut, an owner/operator of a stationary source is required to register with DEP if more than eight tons of pollutants are emitted on a per annum basis. Information must be submitted on the function, structure, and particular output of the source. If emissions do not comply with clean air laws, source owner/operators

are required to install and maintain emission control equipment to reduce the amount of pollution generated. Self-monitoring records are required to be submitted periodically by the facility operator. DEP field inspectors and loan agencies personnel perform periodic on-site inspections to ensure compliance and may issue notices of violation. If the problem is one that cannot be corrected within 30 days, a state order is issued which presents a realistic timetable for repairs or corrections. If not complied with, the state order is enforceable by civil penalties. Since its formation in 1971, DEP has issued 2,940 notices of violation and 566 state orders. To date, 188 state orders have been complied with and 181 are on schedule. Cases of noncompliance are referred to the State Attorney General. Since 1971, 22 cases have been presented and eight are pending legal action. The remaining 14 were settled through court decisions, negotiations, or civil penalties. A new legal device currently allows the Air Compliance Unit to collect civil assessments from violators in an amount equal to the profits earned during the entire period of non-compliance.

EPA Region I has delegated authority to Connecticut for implementation of the Clean Air Act's New Source Performance Standards (NSPS) program as well as the National Emissions Standards for Hazardous Air Pollution (NESHAP) program. The Law requires the establishment of standards for performance for new stationary sources of air pollution and previous stationary sources that, when modified, produce more emissions.

Before a potential source of pollution can be constructed, the developer must obtain a permit to construct from DEP. Plans are submitted by the owner or firm, and DEP decides whether or not to approve or deny the request. If approved, construction can proceed. Upon completion, a test by DEP is made to determine source compliance with existing standards.

With auto emissions creating the major compliance problems with federal air pollution standards in Connecticut, DEP has initiated the preparation of two Transportation Control Plans (TCP) for the Hartford-New Haven and Southwestern Connecticut areas. The plans present in detail programs, actions, and local planning requirements designed to limit the level of vehicular pollutants. The current proposals for these plans, which must be ratified by the State Legislature, were supplied by the Air Compliance Unit and are expected to become effective in May of 1977.

DEP is researching methods in the measurement of pollutants to support and create effective air pollution control regulations. Currently, DEP is developing a model to estimate pollutant levels between monitoring sites. Patterns of air dispersal are simulated mathematically, resulting in the ability to predict either interstate drift of pollutants or the potential effects of a new source. Hazardous Materials Research is also being conducted to determine the health effects of toxic pollutants, such as asbestos, which possess particulate standards no different from other forms of pollutants. DEP is investigating the danger levels of these materials to justify pollutant-

specific regulations. Additionally, extensive cooperation is carried out with Connecticut medical centers and universities through air pollution data exchange.

B. Workforce Profile

The Air Compliance Unit of the Connecticut Department of Environmental Protection has the organizational functions as outlined in the description below. The Air Pollution Control Program is located in the Department of Environmental Protection and has four sections. The function of these four sections, provided by the Unit, are described below.

AIR COMPLIANCE UNIT FUNCTIONS

OFFICE OF THE DIRECTOR. The Office of the Director includes administrative and planning personnel. Staff members organize the operation of the unit, deal with financial matters and perform planning functions.

AIR MONITORING SECTION. The Air Monitoring Section (AMS) operates and maintains Connecticut's ambient air monitoring network of 240 instruments, statistically analyzes monitoring data and prepares air quality summaries.

Twelve trailers with monitoring equipment, data from which are telemetered on a "real time" basis to a computer in Hartford, are the core of Connecticut's air monitoring network.

ENGINEERING SECTION. To fulfill the federal requirements for controlling new and modified sources of air pollutants, Connecticut has a permit and registration program conducted by this section. Over 11,000 emission sources and items of pollution control equipment are registered in the state. To date,over 500 permits for new emission sources have been issued, almost 200 during FY 1974-75. This section is also responsible for preparing the technical support for the Transportation Control Plan.

FIELD OPERATIONS AND ENFORCEMENT SECTION. This section logs and investigates all complaints received. On-site inspections to determine compliance with regulations, evaluation of micrometeorology and local factors are all responsibilities of Field Operations. The section has detected over 2,000 violations and issued approximately 100 compliance orders during the year.

TABLE I depicts the current staffing level of the air pollution control program.

TABLE I

CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION

Air Pollution Control Program
Current (1976) Staffing Levels

Position	1976
Director of Compliance	1
Assistant Director of Compliance	3
Engineer	
Air Pollution Control	46
Intern	1
Environmental Analyst	1
Research Analyst	1
Computer Programer	3
Air Pollution Control Technician	6
Field Inspector	4
Environmental Protection Maintainer	13
Data Entry Operator	2
Federal Grant Participant (CETA) *	1
Clerk Typist	13
TOTAL	95

* CETA - Comprehensive Employment and Training Act.

Additional full-time support is provided through the Connecticut State Health Laboratory. Currently, nine individuals are on loan to the Air Compliance Unit and their positions are depicted in the following table.

TABLE II

CONNECTICUT STATE HEALTH LABORATORY

Air Pollution Control Program Support
Current (1976) Staffing Level

Position	1976
Chemist	7
Technician	1
Clerk/Stenographer	1
TOTAL	9

Thus, the total program staffing for Connecticut's State Air Pollution Control effort is 104 individuals.

At the local level, accurate staffing level figures are difficult to obtain. In fiscal year 1975, funding for local Air Pollution Control Programs by the federal and state governments was substantial, but now has subsided considerably. At this time, the municipalities of Bridgeport, Greenwich, Meriden, Middletown, New Haven, and Stamford have operational local air pollution control agencies. Current estimates suggest that a total of 12 person-years is being devoted to air pollution control matters at this level in Connecticut. Estimates for the private sector workforce in air pollution control are not available.

C. Workforce Projections

Workforce projections for Connecticut's Air Compliance Unit are not available. In the last year, the program has dropped in size from a peak of 134 full-time individuals to the current level of 104. In almost every case, individuals left the program for higher paying jobs in the private sector, both within and outside Connecticut. Air pollution control engineers represent the bulk of the almost 23 percent staff turnover rate. Unfortunately, when a position is vacated within any Connecticut state program, that position is immediately abolished and must be rejustified to be filled again, regardless of whether federal or state funds are involved in supporting that particular position. For Fiscal Year 1978, the program is requesting 26 positions to replace some of those lost during 1976. Most of the positions will be structured for air pollution control engineers. Whether or not these positions will be granted is unknown at this time and cannot be realistically projected.

At the local level, air pollution control workforce growth will not occur over the next five years unless state or federal funding is made available. In the past, when these monies were cut off, the local programs almost disappeared and have since maintained a low profile without workforce growth. The next five year period is likely to reflect the current situation. Finally, no growth estimates are available for the private sector.

D. Training and Certification

Formal Training and Certification for employees of Connecticut's Air Compliance Unit are offered only to those individuals involved in the Enforcement Section. Each new certified individual is exposed to approximately one month of extensive training in source testing, area surveillance, mobile source monitoring, source inspections, and enforcement control. Additionally, Regional Conservation and Preservation inspectors are offered a short duration smoke school to train them to recognize visually potential point source polluters in their immediate jurisdictions.

The State of Connecticut does not recognize a need for training for professional Air Program Personnel, nor does it budget any money for such training. Individuals pursuing further education are allowed a restricted amount of non-penalty time-off to attend classes at their own expense. Additionally, department personnel are allowed to attend independent seminars without deduction of pay. Any training costs incurred for recognized courses and/or seminars come directly out of EPA State Assistance funding used to support Connecticut's Air Pollution Control Program. Due to the cost recovery concept currently in effect for EPA's Air Pollution Training Institute, state air pollution control employees from Connecticut did not attend any of these training sessions in Boston or at Research Triangle Park (RTP).

Finally, at the local private/public level, DEP has recently signed an agreement with EPA Region I which will fund a program to train instructors in motor vehicle emissions control. The funds will be used to

train instructors in specific techniques of motor vehicle emissions testing. In turn, these individuals will be responsible for incorporating these techniques into community vocational high school curricula, as well as continuing education programs for auto mechanics. It is hoped that as the state develops inspection and maintenance programs for antipollution devices on motor vehicles, there will be an adequately trained workforce which can recognize violations of federal emission standards and take necessary corrective action to ensure that a vehicle equipped with pollution control devices meets the prescribed federal standards. Incorporation of these techniques into the curricula offerings is expected to be completed by July of 1977.

E. Career Potential

Career potential within Connecticut's Air Compliance Unit is tenuous at best. Currently, as mentioned in the workforce projections, the program is requesting 26 positions for FY 1978, in addition to the current staff. If these positions are authorized, there will exist a substantial demand for individuals with education and experience backgrounds in air pollution control engineering.

The most promising area for the development of new careers will be in the non-degreed vocational workforce. As outlined in the previous section, EPA has funded a program to incorporate motor vehicle emission testing techniques into vocational high school curriculum.

F. Conclusion

The Air Compliance Unit is responsible for implementing the Connecticut Air Quality Implementation Plan which was developed in 1972 to comply with provisions of the Clean Air Act. To date, the plan has succeeded in bringing industrial pollution concentrations down to federally required levels in most areas of the state. As mentioned before, the plan to achieve pollution reduction has involved the following:

1) Registration of existing pollution sources,
2) A permit system for new pollution sources,
3) Monitoring of air pollution levels,
4) Inspection of potential pollution sources.

However, ambient air quality levels in the state still, on occasion, exceed the prescribed federal standards due to excessive vehicular emissions. The program which will address the problem of motor vehicle air pollution is Connecticut's Transportation Control Plan. The mandatory inspection and maintenance of emissions control equipment, if implemented, should result in a significant demand for non-degreed inspection and maintenance personnel. The mechanism for training delivery to the states vocational educational high schools is currently in the formative stages and should be in place by July, 1977. It is hoped that when inspection and maintenance plans become effective, a cadre of trained non-professionals will be available for immediate implementation of the plan.

II. NOISE

A. Introduction

The 1974 General Assembly enacted public act 74-328 which directs the Department of Environmental Protection to develop:

1) Controls on environmental noise through regulation and restriction of the use and operation of stationary noise sources.

2) Ambient noise standards for stationary noise sources which, in the judgment of the Commissioner, are major sources of noise, including possible adoption of federal EPA Source Standards.

3) Consultation with state and local governmental agencies when such agencies adopt and enforce codes, standards, and regulations dealing with noise.

4) Controls on airports and aircraft noise to the extent not preempted by federal law.

The Noise Compliance Unit of DEP is designated as the regulatory group charged with implementing this act and, to date, have provided consultant service's (upon request) to officials from Communities in the process of revising or developing noise ordinances, as local noise control laws must be approved by and consistent with regulations adopted by DEP. The program has also developed a report on the feasibility of certification of low-noise products and the mandatory labeling of noisy products. Additionally, the program has reviewed and commented on environmental impact statements which have contained noise sections. Currently, the Noise Control Unit is developing standards and regulations for noise abatement and control within the state which sould become effective in late 1976, or early 1977. Once in

place, local communities should move toward developing comprehensive noise control programs through ordinance enactments.

B. Workforce Profile

An advisory committee under the auspices of DEP, works with the program through reviewing options available to the state for noise strategies, and assists in the development and review of rules and regulations pertaining to noise control. The program, as shown on the chart at the end of this section which portrays the organizational structure of the Noise Control Unit, is composed of two individuals, an engineer and an environmental analyst, charged with implementing all program authorities. Other agencies with noise related responsibilities include:

1) The Connecticut Department of Motor Vehicles, which has promulgated regulations for:
   a) Motor Vehicle Sound Level Limits,
   b) Motorcycle Sound Level Limits,
   c) Off-Road Recreational Vehicle Sound Level Limits,
   d) Snowmobile Sound Level Limits.
2) The State Department of Labor, which monitors and inspects occupational noise levels on a part-time basis.

Communities which currently have local noise ordinances are listed on the following page. These communities represent about 17 percent of Connecticut's population.

TABLE III

STATE OF CONNECTICUT

Municipal Noise Ordinances

Jurisdiction	1970 Population	Nuisance	Zoning	Vehicle	Rec/Vehicle	Railroad	Aircraft	Construction	Building
Berlin	14,149	0	X	-	-	-	-	-	-
Bridgeport	156,542	X	X	X	-	-	-	X	X
Farmington	14,390	X	X	X	-	-	-	-	-
Hartford	158,017	0	-	-	-	-	-	-	0
New Haven	137,707	0	X	-	-	-	-	-	-
Stonington	15,590	0	X	-	-	-	-	-	-
Westport	27,414	-	X	-	-	-	-	-	-

Key: X Regulation includes acoustical criteria.
- No Regulation
0 Regulation does not include acoustical criteria.

Source: Sound and Vibration, December, 1976: Clifford R. Bragdon, Georgia Institute of Technology

C. Workforce Projections

The posture of Connecticut's administration is that the current staffing level of the Noise Compliance Unit can fulfill any demands made upon it. This is due, in part, to the desire of the executive branch not to commit itself to anything that may expand programs, such as noise control, due to current fiscal constraints. Despite this pessimistic outlook, the need does and will exist for additional personnel to carry out the legislative mandate in an effective manner.

However, it appears that if federal assistance is not provided by EPA to the program, it most assuredly will operate at a minimal level. Workforce projections cannot be approached due to the number of variables involved.

On the local level, once regulations are in effect, it is anticipated that between 20 and 25 municipalities will implement some type of formal program, with the largest program consisting of one full time employee. It is expected that the local efforts will total about 10 person-years devoted to local noise control.

D. Training and Certification

The Noise Control Unit provides technical assistance to municipalities desiring to upgrade their noise practices through:

1) Assistance in municipal ordinance development,
2) Program implementation and operation training,
3) Consultant services to analyze any special needs or problems.

Currently, the only formal training program for state personnel consists of a regional noise workshop which provides introductory and technical training in environmental noise pollution. The workshop is conducted by the professionals of EPA Region I's noise program in Boston and generally is of a two to four day duration.

E. Career Potential

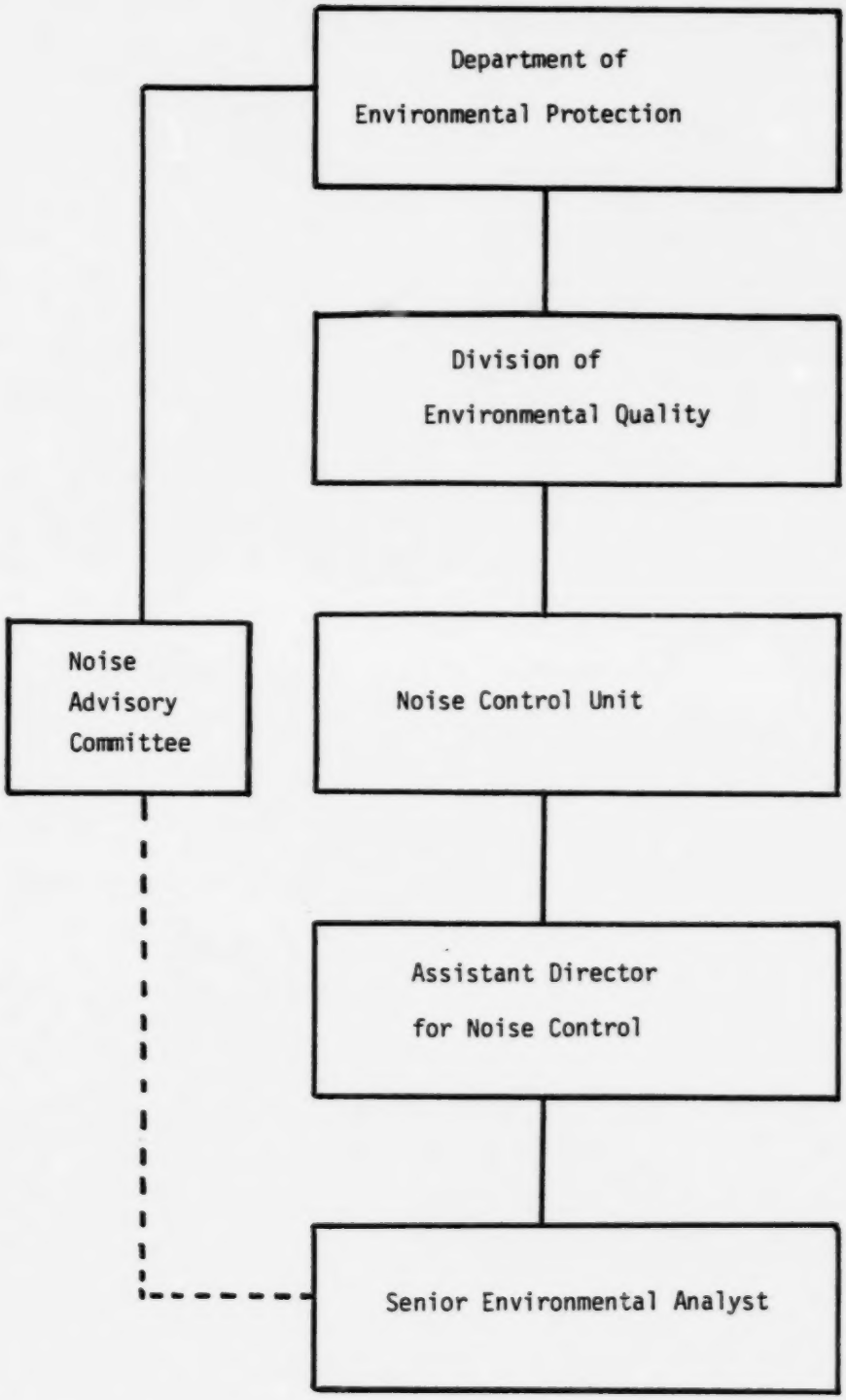
Career potential will exist at the local level for noise technicians to implement community abatement and control programs. Additionally, as one spokesman for DEP has said, with the state's large manufacturing sector, it appears as if significant career potential will exist for individuals responsible for reducing the noise levels of newly manufactured products as federal and state standards are set. Generally, it is expected that design and acoustical engineers will be needed by the state's private sector to ensure compliance.

F. Conclusion

Connecticut is currently in the initial stages of implementing a statewide noise control plan for the municipal level. However, resources will be needed to supplement and enlarge current activities to satisfy the anticipated demand for state assistance. Hence, if the program is to prove successful, the level of concern for the issue on the part of the citizens of Connecticut, the state administration, and the Federal EPA, must be elevated.

Finally, financial support must be increased to remain in concert with existing and anticipated legislative directives to ensure a successful noise abatement and control program within Connecticut.

Figure 2 CONNECTICUT NOISE PROGRAM ORGANIZATION



III. PESTICIDES

A. Introduction

The pesticide program of Connecticut's Department of Environmental Protection (DEP) is responsible for the implementation of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), as amended, within Connecticut. Specifically, FIFRA requires the state to regulate all pesticide distribution and use-related activities in compliance with minimum standards under the act. The primary activity of the program recently is the development and implementation of a state plan to certify all commercial and private pesticide applicators in the state in conjunction with the Connecticut Cooperative Extension Service. This program determines those individuals who possess the necessary skills and expertise to apply restricted-use pesticides.

Those persons applying pesticides under the supervision of a licensed commercial applicator must also be licensed and DEP's pesticide program has prepared an English/Spanish manual to meet training requirements under this program.

Procedures for registration of pesticide chemicals in Connecticut have been upgraded recently to comply with FIFRA requirements. To date, about 3,600 pesticides are registered in the state. Any aerial or aquatic applications of these registered pesticides require special permits. In FY 1975, 225 aquatic permits and 15 aerial permits were issued. Finally, the program must also monitor manufacturer compliance

with state/federal registration laws primarly through marketing inspections. During 1975, the program inspected 315 distributors and found 145 violations of the state pesticide laws. There were 300 samples taken for analysis and 34 of these were found to be in non-compliance with promulgated rules and regulations.

B. Workforce Profile

The Pesticide Compliance Unit of DEP's Environmental Quality Division has four people employed in the program. They include an assistant director, an environmental analyst, an inspector and a clerk/typist. An active relationship is present with Connecticut's Cooperative Extension Service, which is the primary delivery mechanism for applicator training classes. Additionally, the tree protection examining Board of Connecticut issues all aborist applicator licenses and works closely with DEP's pesticide program. Table IV presents a description of the staff in tabular form.

TABLE IV

CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION

Environmental Quality Division
Pesticide Compliance Unit
Current (1976) Staffing Level

Position	1976
Assistant Director	1
Environmental Analyst	1
Inspector	1
Clerk/Typist	1
TOTAL	4

Table V shows the Licensed Commercial and private applicator workforce as of July 31, 1976 by category.

TABLE V

STATE OF CONNECTICUT

Current (1976) Certified Pesticide Applicators
By Licensing Category

Category	1976	
Commercial:		
Agricultural Pest Control	35	
Forest Pest Control	7	(temporary)
Custom Ground	268	
Golf Course Supt.	21	
Aquatic	40	
Rights of Way	99	
General Pest	161	
Termite	136	
Rodent and Bird	151	
Fumigation	23	
Mosquitoes and Biting Flies	1	(temporary)
Soil Fumigation	1	
Sub-Total	(943)	
Private:		
Private Applicators	1,098	
Sub-Total	(1,098)	
TOTAL	2,041	

C. Workforce Projections

The Pesticide Compliance Unit has had a decline of two positions within the last year - one environmental analyst and one clerk. Due to Connecticut's state attrition policy (any vacated position is auto-

matically eliminated and must be justified again as a new position), it does not appear that these positions will be refilled. In fact, five year estimates for the program show that it expects to pick up only one additional inspector, making a total state pesticide workforce in 1981 of five.

The anticipated certified applicator workforce by October, 1977, in the private sector is depicted in Table VI.

TABLE VI

STATE OF CONNECTICUT

Pesticide Workforce Staffing Levels
for the Private Sector (est. October, 1977)

Classification	1976/1977
Commercial Applicators:	
Supervisory	800-1,000
Operator	2,000-3,000
Private Applicators	1,200-2,000
TOTAL	4,000-6,000

D. Training and Certification

Pesticide certification and training activities represent the major thrust of the Pesticide Compliance Unit's program activities. The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), as amended, requires that all individuals involved in the supervision of the application of restricted-use pesticides be trained, examined, and certified in compliance with minimum federal standards. Connecticut

had a commercial applicator certification program prior to that required by FIFRA and has already certified most in this category.

New standards under recent federal and state laws have resulted in a sharp increase in the number of people licensed to apply pesticides. Numerous classes ranging from one day to 12 weeks have been held for those persons desiring to become licensed or relicensed. All commercial applicators were relicensed during 1975,and the types of licenses were adjusted to conform to FIFRA requirements. Tests covering 15 different fields were given to 384 previously licensed commercial applicators. An additional 450 individuals seeking a license for the first time as commercial applicators were also tested. Dealers have become subject to licensing restrictions and,to date,about 105 have been certified and registered.

In 1975,private applicators were licensed for the first time and ten training manuals were developed by the Pesticide Compliance Unit. The Connecticut Cooperative Extension is giving classes to these private applicators at several locations throughout the state. In 1975, a total of 1,144 private applicators had been tested and certified.

All persons using pesticides professionally in Connecticut must pass a written and oral examination. There are two classes of commercial licenses: supervisory and operational.

The Supervisory Licenses are required for "commercial applicators who are responsible for deciding whether or not pesticides are to be employed, how they are to be mixed, where they are to be employed,

what pesticides are to be used, the dosages and timing involved in such pesticide use, and the methods of application and precautions to be taken in the use of such pesticides.

Separate examinations are offered as follows:

1. Agricultural Pest Control
   a. Plant
   b. Animal
2. Forest Pest Control
3. Ornamental and Turf Pest Control
   a. Custom Ground
   b. Arborist
   c. Golf Course Superintendents
4. Seed Treatment
5. Aquatic Pest Control
6. Right of Way
7. Industrial, Institutional, and Structural Pest Control (Indoors)
   a. General
   b. Termite
   c. Fumigation
   d. Rodent and Bird
   e. Mosquitoes and Biting Flies
8. Public Health
9. Regulatory
10. Demonstration and Scientific

Arborists' licenses are granted by the Tree Protection Examining Board. Operational commercial licenses and supervisory licenses are awarded by the Pesticide Compliance Unit. Applicators who pass the written examination must take an oral examination before receiving certification.

Training statistics for Connecticut can be seen in the following three tables. It should be noted that the summary numbers shown do not represent the number of certified applicators. All figures indicate the number of participants in individual applicator training sessions on a cumulative basis. For instance, one individual might elect to receive training in more than one licensing category; thus this individual would be counted more than once in these figures. The

following tables merely show the bulk of training needed, and the figures are not necessarily proportional in any way to the number of certified pesticide applicators.

Table VII shows the current status of commercial applicator training. Table VIII represents the extent of private applicator training activities. Finally Table IX summarized the status of all pesticide applicator training in Connecticut. As all tables evidence, Connecticut has completed the major portion of its anticipated training responsibilities.

TABLE VII

STATE OF CONNECTICUT

Status of Commercial Applicator Training

Anticipated Total Training Participants by October, 1977	Numbers Trained as of January, 1977	Numbers still to be Trained by October, 1977
1,160	1,005	155

TABLE VIII

STATE OF CONNECTICUT

Status of Private Applicator Training

Anticipated Total Training Participant by October, 1977	Numbers Trained as of January, 1977	Numbers still to be trained by October, 1977
1,407	1,282	125

TABLE IX

STATE OF CONNECTICUT

Status of Commercial and Private Applicator Training

Anticipated Total Training Participants by October, 1977	Numbers Trained as of January, 1977	Numbers still to be Trained by October, 1977
2,567	2,287	280

Source for Tables VIII, IX, and X: Regional Support Branch, Operations Division, Office of Pesticide Programs, U.S. Environmental Protection Agency

E. Career Potential

Career potential at the state level with the Pesticide Compliance Unit of the Department of Environmental Protection will be limited to a field inspection position. New career openings in the private sector are unknown and will not be readily determinable until the present workforce is certified, thus defining the scope of the labor force. Attrition rates and new entries can then be determined on a yearly basis to provide some idea of the growth in this sector.

F. Conclusion

There exist no significant projected pesticide workforce increases in Connecticut at the state level primarily due to the fact that a commercial applicator program was already in place in the state prior to

FIFRA requirements. Thus the mechanism (state workforce) for certification is already established. At the private/commercial level, the workforce is currently being defined. Once defined, its characteristics (i.e., turnover, new entries) will become better known,thus enabling specific career potential and workforce projections to be made.

IV. POTABLE WATER

A. Introduction

The Safe Drinking Water Act, enacted in 1974, will be implemented through the Water Supplies Section of the Connecticut State Health Department under Connecticut Public Health Code Regulation 19-13-B012. Connecticut water utilities must be producing quality public drinking water supplies by June 1, 1977; however, standards for color do not become effective until June 1, 1979.

The Connecticut regulations provide that an annual watershed survey will be conducted and that raw water samples will be taken. Standards are set as to the degree of treatment to be furnished, depending on raw water quality, and for quality and testing of water ready for consumption. They prescribe treatment techniques, including a minimum chlorine residual, and call for surveys and an annual report on potential hazards in the distribution system. Provision is made for public notification in case of failure to comply with the standards and for granting variances or exemptions, following hearing, in the event of inability to meet the standards for a good reason when it can be established there is no imminent hazard to the public health.

Public water supplies in Connecticut supply drinking water to 2,560,000 persons (about 82% of the population). There are now 350 public systems which obtain water from 800 sources that are being monitored and inspected. The average daily usage is 378.5 million

gallons. Approximately 75% of this comes from surface water reservoirs and lakes, and 25% from ground water.

Of the 116 listed surface water sources, only 29 or 25% are filtered. There is a total of 323 (chlorination) disinfection plants. Fluoridation is now provided at 101 treatment plants furnishing water to 2.15 million persons (69% of the population).

Priorities for ensuing years will be directed to ensuring that Connecticut successfully accepts primacy for implementing provisions and regulations under the Safe Drinking Water Act. To aid the state in this function, EPA Region I's water supply program will be providing surveillance and analysis support as well as technical assistance as the dimension and complexity of the state's pre-primacy workload increases. As the non-community sources of potable water are identified and inventoried pursuant to SDWA requirements, they will come under the rules and regulations of SDWA. This will most likely occur sometime in 1979, and may result in a substantial effort on the part of Connecticut's state water supply program personnel, due to the fact that many towns and non-community supplies may encounter financial difficulties upgrading their supplies to federal standards. In addition, variances and exemptions from the act and its accompanying regulations will require detailed processing, further increasing the program's workload under primacy.

Pursuant to the acceptance of SDWA primacy, it is anticipated that over the next five years workload increases will occur during the winter of 1978, as smaller towns in the state become unable to meet interim regulations due to the lack of resources needed to finance necessary corrective alterations to existing facilities and systems. As the program approaches June of 1979, when all non-community sources must meet regulations set forth under the act, the workload will again increase to accomodate necessary reviews for exemptions, variances, and assistance.

B. Workforce Profile

Table X below represents staffing levels within the Water Supplies Section of the Connecticut State Health Department, which administers the water supply program in the state. There are a total of 16 staff members in the state potable water program as follows:

TABLE X

CONNECTICUT HEALTH DEPARTMENT

Water Supplies Section
Current (1976) Staffing Level

Position	1976
Engineer	10
Sanitarian	1
Chemist	2
Lab Technician	1
Other	2
TOTAL	16

There are presently 30 certified water treatment plant operators in the state of Connecticut. Only chief plant operators are required

to be certified. Current data on water supply staffing levels for personnel other than operators are not available.

C. Workforce Projections

Workforce projections in the water supply program cannot be estimated at this time. The only reliable estimate offered by a program administrator is that the number of certified treatment plant operators is expected to double over the next five years. It would, however, seem likely that the approaching deadlines for compliance with SDWA standards would necessitate workforce increases, particularly as the program approaches June of 1979, when all non-community sources must meet the quality standards mandated by SDWA. On the other hand, funds made available to the state through the grants-in-aid program, which was created under the auspices of SDWA to aid the states in upgrading their water supplies, is insufficient at present to support more than a moderate workforce increase. Table XI represents anticipated monitoring and workforce needs for implemention of SDWA for fiscal year 1976 through 1978.

TABLE XI

STATE OF CONNECTICUT

Cost and Workforce Estimates for
Safe Drinking Water Act Implementation
Fiscal Years 1976 to 1978

State Share	Federal Grant	Total	Person-years
FY 76 (April 1976 - September 1976) - FINAL			
$ 176,488.00	$ 91,700.00	$ 268,188.00	10.5

TABLE XI
(continued)

State Share	Federal Grant	Total	Person-years
FY 77 (October 1976 - September 1977) - TENTATIVE			
$ 353,000.00	$ 183,400.00	$ 536,400.00	26.5
FY 78* (October 1977 - September 1978) - ESTIMATED			
$ 353,000.00	$ 230,000.00	$ 583,000.00	28.5

* Assumes work with community systems throughout FY 78. No allowance for staff required to handle non-community systems in FY 79.

D. Training and Certification

Connecticut does not have a formal certification program for plant operators at present; however, the state legislature is in the process of formulating a law which would make such a program mandatory. At present, only chief operators are required to be certified by the state.

The Connecticut State Health Department offers limited direct training to water supply operators. However, there are training programs available in the state, often at the undergraduate and graduate levels, as depicted in Table XII. The state has access to a limited amount of training funds under the SDWA grants-in-aid program which may be utilized by employees to attend workshops sponsored by groups such as EPA, the American Water Works Association, or the Sanitarian's Association. Attendance at any of these programs is purely voluntary on the part of the utilities.

TABLE XII

STATE OF CONNECTICUT

Select Water Supply Training Programs

Type of Education Program	Sponsoring Agency	Duration and/or degree
Water Ecology (emphasis on water, wastewater, treatment systems, and drinking water)	Farmington High School	one course/day
Environmental Science and Technology (emphasis on wastewater, water, air, environmental management, and solid waste)	Hartford Graduate Center	Master of Science
Civil Engineering (emphasis on soil, water, wastewater, and solid wastes)	University of Connecticut Grad School at Storrs	Master of Science in Civil Engineering, B.S. in Civil Engineering
Master of Science in Environmental Studies (emphasis in water treatment, wastewater treatment, and air pollution)	University of New Haven, West Haven	Master of Science in Environmental Science

EPA offers another less obvious aspect of training which Connecticut and other states may choose to take advantage. This involves the placement of regional personnel in the state water supply programs through temporary assignments. This method allows permanent state program personnel to receive extended firsthand informal training in all aspects of federal water rules and regulations and gives the state programs immediate access to the skills and knowledge which the agency requires to carry out responsibilities mandated by the Safe Drinking Water Act.

In addition, the Office of Water Supply at EPA Headquarters in Washington has proposed a long term, three phase national training program which will place an evenly divided emphasis on state, federal, and local programs. Phase I strategy calls for training all personnel involved in Water Supply with the specific skills they need to effectively assume responsibilities outlined under the Safe Drinking Water Act. A list of training resources which will ultimately impact Connecticut is currently being developed by the Water Supply Office under this phase, as depicted in Table XIII. Phase II will involve operational support in the form of technical assistance to the state and local water programs. Phase III will be an attempt to forecast long range program support to meet all program and workforce requirements through February, 1985.

E. Career Potential

Career opportunities in water supply will likely be limited over the next five years. Temporary workload increases are expected to occur as the program approaches the deadline for compliance with SDWA quality standards in June of 1979. However, unless financial constraints can be overcome, the possibility of anything more than a minimal increase in long term career opportunities at either the state or local level is unlikely.

TABLE XIII

TRAINING PACKAGES CURRENTLY BEING DEVELOPED BY THE OFFICE OF WATER SUPPLY, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, UNDER PHASE I OF ITS NATIONAL TRAINING STRATEGY WHICH WILL IMPACT CONNECTICUT

1. Safe Drinking Water Act (1974) implementation workshops and materials for local operators and officials
   - available March 1977
2. A basic operator training course for entry-level water supply personnel designed for delivery by state educational institutions and agencies
   - available summer 1977
3. Laboratory certification courses for regional and state personnel involved in certifying chemical and bacteriological laboratories
   - available early 1977
4. Laboratory methodology courses in approved testing methods for regional, state, and local laboratory technicians
   - available summer and fall 1977
5. Sanitary survey courses in the methodology involved in surveying small water supply systems as well as more complex systems
   - available October 1977
6. Public notification short course for local suppliers to aid in handling public notification procedures
   - available summer 1977
7. Variances and exemptions course for state personnel to determine procedures involved in such instances under SDWA (1974)
   - available summer 1974
8. State training program management course for regional and state agency personnel in training planning
   - available spring 1977

Source: Office of Water Supply, Training Strategy, October 21, 1976.

F. Conclusion

Connecticut is expected to assume primacy for implementing the provisions of the Safe Drinking Water Act within the next five years. Its success in doing so depends in part upon the extent of EPA's commitment to provide substantial funding to support the state's water supply program. The impact of a state law requiring a strict certification program is unknown at this time; it seems likely, however, that the proposed law would require additional funds for training purposes.

V. RADIATION

A. Introduction

The Radiation Control Program for Connecticut is located within the Environmental Quality Division of the Department of Environmental Protection. The program is responsible for regulating the use of sources of ionizing radiation with the aid of reducing the radiation exposure of the general public and workers to the lowest practicable level.

A statewide radiological surveillance program is carried on to evaluate levels to which the public might be exposed. The monitoring program provides routine sampling of the environment in the following areas:

1) Air particulates and external radiation levels;
2) Water from precipitation reservoirs, wells, streams, and ocean water
3) Dairy Farm milk
4) Seaweed
5) Shellfish
6) Fishes
7) Sediment

Monitoring of these aforementioned areas is performed to identify any changes in the radioactive nature of the specific environments. If necessary, appropriate action is taken to protect the public health and safety.

Additionally, the program has developed a radiological emergency response plan in cooperation with the State Police Department to be prepared should an accident involving radioactive materials occur. The program inspects and evaluates patient and operator exposure to X-rays generated by both diagnostic and therapeutic X-ray machines to ensure state regulations compliance.

Finally, on June 1, 1976, the transportation of radioactive materials in large quantities became regulated by the state through a permit system operated by the Connecticut Department of Transportation. The Radiation Compliance Unit is responsible for spot checks enroute.

B. Workforce Profile

The Table below depicts the Department of Environmental Protection Radiation Compliance Unit's current staffing level.

TABLE XIV

CONNECTICUT DEPARTMENT OF ENVIRONMENT PROTECTION

Environmental Quality Division
Radiation Control Unit
Current (1976) Staffing Level

Position	1976
Director	1
Radiation Control Physicist	2
Radiation Control Technician	2
Typist	1
TOTAL	6

A chart following this section reflects the organizational structure of this unit within the DEP.

Additionally, the State Department of Health performs routine laboratory work for the unit. The staff devoted to radiation sample analysts consists of one full-time and two half-time laboratory analysts. At the University level, there are approximately 10-12 individuals who conduct environmental monitoring. In Connecticut, altogether, it has been estimated that there are about 40 individuals (technical and professional, public and private) engaged in environmental monitoring.

C. Workforce Projections

Over the next five year period, the Radiation Compliance Unit expects to grow by the addition of at least three radiation control physicists due to heightened public interest. To date, the turnover rate has been zero. If public awareness continues at the present level, the entire state (public and private) environmental monitoring workforce could double between now and 1982.

D. Training and Certification

Currently, the Department of Environmental Protection offers no formal training for employees of the Radiation Compliance Unit. There does, however, exist a definite need for such to maintain up-to-date knowledge of the field. Specifically, short term and highly specialized courses in radiation protection are needed. Within the University System in Connecticut, Hartford State Technician College offers an associate degree in nuclear technology.

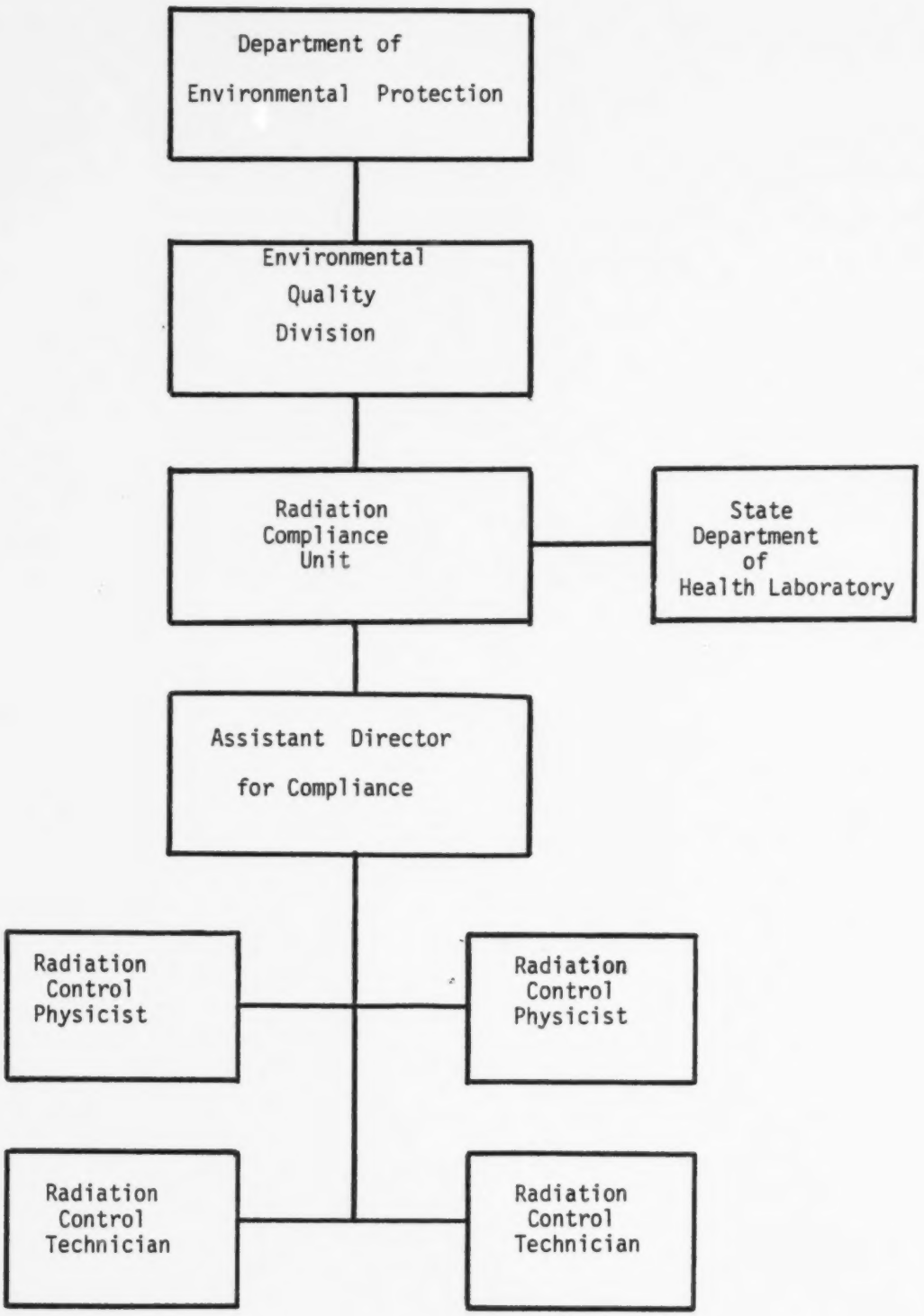
E. Career Potential

New careers in Radiation Control within the Radiation Compliance Unit will call for highly trained Radiation Control Physicists. Additionally, in the private sector, increased environmental radiation monitoring activities of college and universities within the state are likely to result in an increase in radiation control research careers.

F. Conclusion

The Radiation Compliance Unit of Connecticut's Department of Environmental Protection will experience a relatively significant workforce increase over the next five years. The private sector is likely to experience the same if public interest in radiation protection continues to grow as expected. Training offered professionals within the state is minimal and must be secured out of state at ever-increasing costs. It is believed that there exists a sufficient workforce which could justify offering short-duration courses in radiation control within Connecticut. However, the Department of Environmental Portection is not in a fiscal situation that could allow this. Thus, federal sources will most likely be called upon in the near future to finance these training needs.

Figure 3 CONNECTICUT RADIATION CONTROL PROGRAM CHART



VI. SOLID WASTE

A. Introduction

In 1971, Connecticut established an Office of Solid Waste Management within its newly created Department of Environmental Protection (DEP) to ensure that the state maximize all resource recovery potentials and disposes of all refuse in an environmentally acceptable manner pursuant to Public Act 845. Additionally, as the result of a state plan developed by DEP, the state legislation created the Connecticut Resources Recovery Authority (CRRA) to implement a statewide resource recovery facility construction plan. (CRRA will be described later in more detail).

Through existing regulatory authority, the Office of Solid Waste Management regulates the disposal of all solid wastes generated in Connecticut. The program inspects and issues permits to all solid waste disposal facilities, monitors the operations of such facilities, and issues orders to correct violations. The Office provides all necessary technical assistance as requested by the permitee and cooperates extensively with CRRA. The Office provided the following summary of its 1975 program goals and achievements:

SOLID WASTE MANAGEMENT UNIT

> The major objective of the Solid Waste Management Unit is to assure that solid wastes are processed and disposed of in a manner that will maximize resource recovery, minimize health and environmental problems, and minimize the land required for ultimate disposal of solid wastes. Administrative Regulations pertaining to solid waste management were adopted by the Department in an effort to achieve this objective.
>
> The unit is continuing its activities in four major areas: 1) Enforcement, 2) Technical Services, 3) Training, 4) Hazardous Wastes.
>
> The Department conducted 928 inspections of public and private solid waste disposal areas. These were part of our routine inspection program, a result of complaints received or in follow-up of the 43 orders and 61 notices of violations

that were issued. During these inspections, approximately 123 water samples were collected and analyzed.

Included in the activities of Technical Services were the following: 1) Approximately 60 site surveys were conducted which resulted in the issuance of 15 permits to establish new solid waste disposal areas. 2) Approximately 20 surveys of potential transfer station sites were made and five sets of plans and specifications for transfer stations were reviewed. As a result, two permits were issued during the fiscal year and there are now five transfer stations operating in Connecticut. 3) Seven municipal incinerator and shredder facilities were inspected. 4) Twenty-one municipal solid waste management plans were received and reviewed. 5) Nine regional planning studies, including 122 municipalities, have been approved for funding by the Bond Commission. Staff members assist in reviewing qualifications and selection of qualified consultants to carry out the studies. They also provide assistance to the municipalities and consultants throughout the study period. 6) The unit coordinated its activities with those of regional planning agencies and the Connecticut Resources Recovery Authority in providing assistance and information to community officials. 7) Over 70 talks were given and 500 conferences were held with the public, service clubs, local committees and local officials as part of the public education and consultation program. 8) Grants amounting to $2,057,577 were committed for assisting municipalities in the purchase of equipment, construction of facilities and conduct of engineering studies.

Training activities resulted in certifying 190 land disposal area operators and conversion of operations at five disposal sites to the more efficient cell method. A textbook for the operators of land disposal areas was prepared and published.

In December 1974, a hazardous waste program was initiated to assess the scope of the waste problem and the existing systems available for disposal of these wastes. The ultimate goal of this program is to improve disposal systems and minimize related environmental and health hazards. Since the program was started, the following activities have been completed. Questionnaires were prepared for industries to fill out, 177 personal interviews were conducted, 330 returns (60%) were received from a mail survey, 13 site surveys for industrial waste disposal were made, two existing industrial solid waste disposal areas were monitored, one public hearing on industrial waste issues was held.

The second priority of the Office of Solid Waste Management involves the establishment, operation, and maintenance of environmentally acceptable sanitary landfills throughout the state. Currently, in Connecticut 28% of the state's population (868,588 people) is served by environmentally

acceptable disposal facilities, which places Connecticut fifth in Region I in this respect. Landfills in the state total 149 and are primarily operated by municipalities. Table XV gives a breakdown of public and private landfill operation within the state.

TABLE XV
STATE OF CONNECTICUT
Operating Landfills

Public	Private	Total
132 (89%)	17 (11%)	149

Source separation in both rural and urban areas is developing in anticipation of a total resource recovery disposal system for all waste generated within the state.

Hazardous waste management within Connecticut was initially approached in 1974, by a survey to assess the current sources of generation within the state as well as systems in existence available for processing these wastes. Due to the highly industrial nature of the state (over 6,000 industrial plants), it has been estimated that about 350,000 tons of industrial wastes are produced each year as a byproduct of the state's manufacturers. The Solid Waste Division has initiated extensive technical assistance to manufacturers who are disposing of these wastes in an environmentally unacceptable manner. The recommendations made by the staff are directed toward source reduction, i.e., reclaiming as much as possible; thus minimizing the amounts of hazardous/toxic wastes to be processed for disposal.

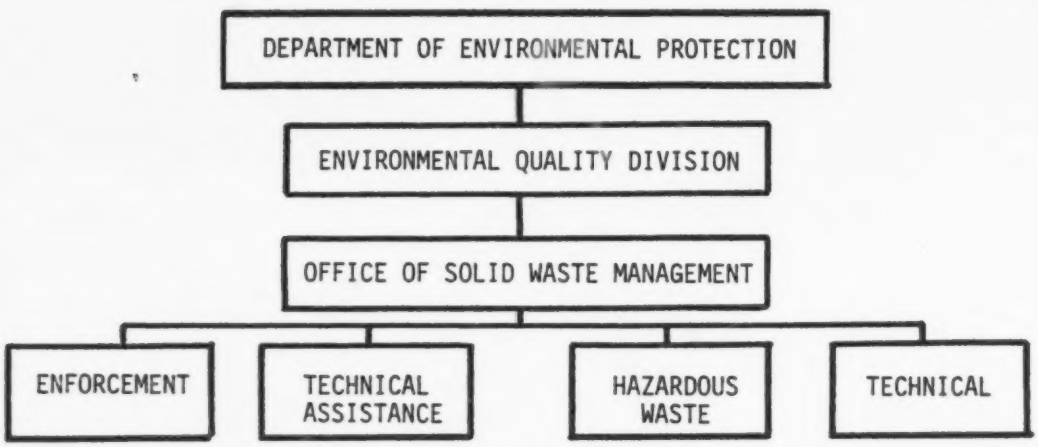
At present, there are only limited numbers of regulations in the state specifically dealing with the generation, collection, transportation, storage and disposal of hazardous wastes. If a generator has the necessary technical and scientific expertise to prepare hazardous/

toxic wastes for landfill regulatory authority, can issue a permit for land disposal of these wastes. The Hazardous Wastes and Water Compliance Units of DEP possess statutory authority for liquid waste transportation registration within the state.

B. Workforce Profile

The Connecticut Solid Waste Management Program has the following organizational structure.

CONNECTICUT SOLID WASTE PROGRAM



As shown, the program is located within the Environmental Quality Division of Connecticut's Department of Environmental Protection (DEP). The office is currently staffed by 19 individuals, in addition to a director, and represents the largest state solid waste workforce in Region I. Currently the Office of Solid Waste Management has received a $101,000 federal grant from EPA to support its program for FY 1977. These funds are utilized by Connecticut DEP in the areas of:

1) land disposal site control
2) hazardous and special waste control
3) waste reduction and resource recovery
4) solid waste management regulation implementation and enforcement

This federal assistance from Region I represents a $37,000 drop from FY 1976 which resulted in the loss of four positions through attrition. The following table depicts a current breakdown of employees in the program.

TABLE XVI

CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION

Office of Solid Waste Management
Current (1976) Staffing Level

Position	1976
Administrator	1
Engineer	7
Geologist	3
Biologist	2
Field Inspectors (technicians)	4
Clerk/typist	3
TOTAL	20

Another solid waste agency exists in the state, the Connecticut Resource Recovery Authority (CRRA). CRRA was established in 1973 by the state legislature as a result of a state plan calling for the maximum recovery of renewable resources within the state. CRRA draws its functions from the following set of five purposes for existence:

1) The planning, design, construction, financing, management, ownership, operation, and maintenance of solid waste disposal, volume reduction and resources recovery facilities and all related solid waste reception, storage, transportation and waste-handling and general support facilities considered by the authority to be necessary, desirable, convenient or appropriate in carrying out the provisions of the state solid waste management plan and in establishing, managing and operating solid waste disposal and resources recovery systems and their component waste-processing facilities and equipment.

2) The provision of solid waste management services to municipalities, regions and persons within the state by receiving solid wastes at authority facilities, pursuant to contracts between the authority and such municipalities, regions and persons; the recovery of resources and resource values from such solid wastes; and the production from such services

and resource recovery operations of revenues sufficient to provide for the support of the authority and its operations on a self-sustaining basis, with due allowance for the redistribution of any surplus revenues to reduce the costs of authority services to the users thereof;

3) The utilization, through contractual arrangements, of private industry for implementation of some or all of the requirements of the state solid waste management plan and for such other activities as may be considered necessary, desirable or convenient by the authority;

4) Assistance with and coordination of efforts directed toward source separation for recycling purposes; and,

5) Assistance in the development of industries and commercial enterprises within the state of Connecticut based upon resources recovery, recycling, and reuse. These purposes shall be considered to be operating responsibilities of the authority, in accordance with the state solid waste management plan, and are to be considered in all respects public purposes. It is the intention of this chapter that the authority shall be granted all powers necessary to fulfill these purposes and to carry out its assigned responsibilities and that the provisions of this chapter, itself, are to be construed liberally in furtherance of this intention.

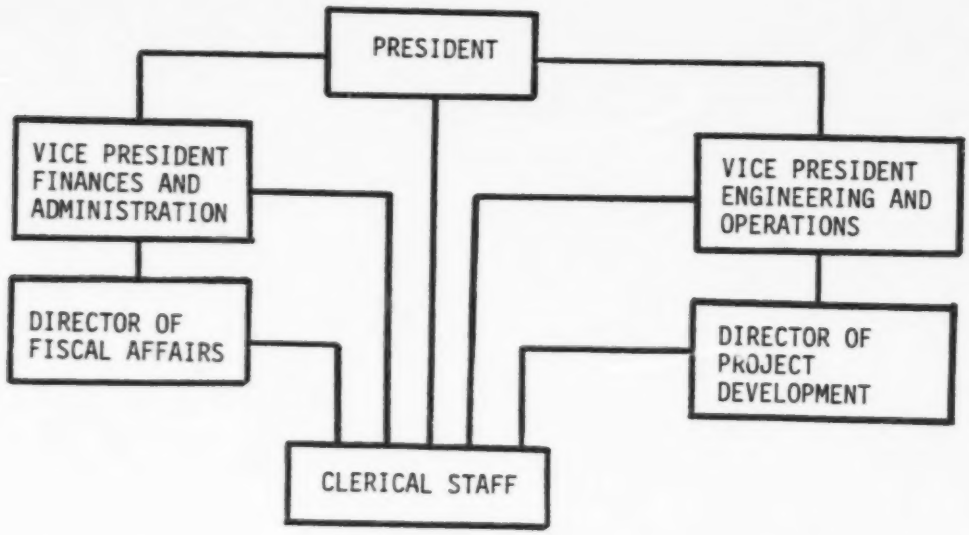
The activities of CRRA must conform to DEP's overall state solid waste management plan and any activities resulting in the development of industry and commerce based upon the availability of recovered resources for recycling must be coordinated with the activities of the Connecticut Development Authority. Concurrently, consideration must be given to the secondary materials markets within the state.

In March 1976, CRRA signed a contract with CEA-OXY Resource Recovery Associates (as association of subsidiaries of Occidental Petroleum Corporation and Combustion Equipment Associates) which calls for the design, construction, operation, and maintenance of a 2,400

tons per day (TPD) resource recovery facility for the greater Bridgeport area. Currently, final determinations are being made concerning the choice of contractor for a 1,800-2,600 TPD water-wall incineration facility in New Haven.

Presently, CRRA is implementing a statewide plan which calls for the construction of ten resource recovery facilities by 1985, financed by revenue bonds through CRRA. It is anticipated that these sites will be designed to process at least 84 percent of Connecticut's municipal waste.

As shown in the following diagram, CRRA has the following organizational structure:



Currently, the Authority is operating with 15 personnel who have been classified as highly technical professionals. Their backgrounds include planning, financing, and engineering. Currently, there are two engineers responsible for maintaining liaisons with the contractors and/or communities establishing resource recovery facilities. The Authority has a legal staffing ceiling of 30 individuals which was determined by the state legislature to ensure a maximum amount of utilization of the private sector for design, construction, and operation of all facilities. It has been projected that within three years, as resource recovery facilities begin operation, upwards of 120 professional and technical persons will be involved in operation-related aspects. Plant engineers, laboratory scientists, transfer station attendants, drivers (12-15), and machine operators (2-5) will likely be the workers who will be obtained from local incinerator operations geared down as the result of installing a resource recovery facility. It has been estimated that

80 percent of the individuals employed by a typical plant will be non-degreed and will work in labor-intensive areas.

Finally, Connecticut's resource recovery program is strictly voluntary; communities are not required to utilize the services of CRRA facilities unless they determine that participation is economically beneficial. No regulation of rates exist either; thus, cost of CRRA-related disposal facilities must be competitive with other methods of disposal.

C. Workforce Projections

The impact of the new Resource Conservation and Recovery Act of 1976, PL 94-580, at the state level will probably be concentrated in the area of hazardous waste management. As Connecticut has established a statewide resource recovery authority (PL 94-500 calls for extensive development of resource recovery), its program will more than likely be utilized as a model for other states. Staffing level projections are somewhat difficult to develop due to the unknown degree of financial assistance which EPA will offer Connecticut. State increases in appropriations to support the program will most likely be minimal; thus, PL 94-580 state assistance grants will be the limiting and determining factor in regards to state program growth. Officials of the Office of Solid Waste Management speculate that five or more professional positions will be added to the current staffing level within the next two years, with a subsequent leveling off thereafter. More than likely, these individuals will be involved in developing Connecticut's hazardous waste management program. Turnover rates to date have averaged about ten percent per annum

for the program and have, in large part, been due to 40 percent higher salaries offered by industry. Furthermore, replacement after attrition is a long process as positions must be justified again, even if the position vacated was supported through federal funds. Thus, growth in the state program is likely to be somewhat restrictive in nature.

In the municipal and private sector, workforce growth will primarily be in the non-degreed, labor-intensive area of resource recovery as facilities become operational. Estimates for actual growth have been somewhat contradictory, owing to the continually changing strategy for developing facilities throughout the state; thus, formal projections are not available. However, during this development phase, the primary emphasis on new careers will center around planning and design engineers prior to actual plant construction. Additionally, construction-related jobs should be on the increase as 11 major facilities are slated for development by 1985.

The collection, transportation, storage, and disposal of hazardous/toxic wastes is also likely to result in a cadre of trained technicians responsible for ensuring the integrity of hazardous waste processing. As most of these wastes are generated in the private sector, workforce growth will likely be located in industry and be substantial due to connections highly industrialized in nature. The aforementioned growth potential will be pursuant to the establishment of comprehensive state-wide hazardous waste management regulations for industrial generators.

D. Training and Certification

Within Connecticut's Department of Environmental Protection there exists no formalized job training or upgrade training for professionals engaged in the state's solid waste program. Informal education and training does exist in the form of on-the-job training (OJT). The state Civil Service Commission does, however, offer development courses for non-professionals, primarily for those in secretarial positions. It is the philosophy of the agency to hire individuals with sufficient field experience and background and then rely on informal OJT to educate them in the specifics of the state's solid waste program. Occasionally, employees attend EPA workshops and seminars either within Connecticut or at EPA headquarters in Boston. Generally, it is felt that these sessions provide excellent insights for DEP employees on the operation and functions of EPA's solid waste program in the region as well as a valuable exchange of the technical information which EPA has in its possession. Recently, a conference on source separation, jointly sponsored by DEP and EPA Region I was held in Hartford, Connecticut, to discuss the economics of source separation, the methods currently available, secondary materials markets, and public education. The conference was for municipal solid waste officials in Connecticut interested in developing source separation programs within their communities.

Due to EPA's wealth of information, it has been the concensus of opinion, not only in Connecticut but also in the other five New England states, that the frequency of these technical and training workshops should be increased considerably. Because of limited funds for out of

state travel, it is felt that a move should be made to develop a comprehensive state delivery of these services, and it appears PL 94-580 will satisfy this need. Finally, university cooperation in Connecticut is developing,and professionals have worked with the University of New Haven to offer course presentations to students. Generally, it appears that university courses are limited for DEP solid waste personnel, relating to solid waste management, which provide anything more than introductory training. More than likely, expansion in university cooperation will take the form of teaching rather than course enrollment.

Training for landfill operators at the municipal level is provided by the Office of Solid Waste Management on a formal basis. In 1975, approximately 190 sanitary landfill operators were certified as a result of DEP's training. Subsequently, the training resulted in the upgrading of five sites in the state to more efficient operating capabilities. Currently, in the state, there are 300 certified solid waste landfill operators. A textbook for environmentally acceptable landfill operation has been prepared by DEP and distributed as a training aid for municipal operators. Finally, state field inspectors receive formal training from the Department in inspection techniques and procedures when conducting on-site assessments of municipal disposal facilities.

Training in resource recovery facility operation at the present time will most likely be satisfied by those construction and engineering firms contracted for facility development. As it is intended that operation of new facilities will be the responsibility of the contractor, training for operators and related diciplines will likely emanate from in-house capabilities.

The new Federal Resource Conservation and Recovery Act will aid Connecticut in supplementing its training strategies considerably. This act authorizes EPA to make either grants to or contracts with state solid waste programs to develop and implement training programs to train individuals for occupations in solid waste management. Funds are available under this act to train instructors and supervisory personnel to train or supervise the workforce involved in solid waste disposal. It is anticipated that training goals and activities for Connecticut's solid waste program will be upgraded if DEP accepts the training funds available under this act. Explicitly defined state strategies for future solid waste training in Connecticut under PL 94-580 have not at this time been approached.

E. Career Potential

Career potential in the state solid waste program will be limited over the next five years as Connecticut has already established a well staffed program. Funds to the state under PL 94-580 are likely to result in the addition of a cadre of professionals versed in hazardous wastes from both technical and managerial perspectives. This developing area, however, will most likely have its major career impact on the industrial sector as any promulgated regulations will be the compliance responsibility of this sector. Furthermore, the severity and extent of these anticipated regulations will be the determining factors as to the types of careers to be staffed (either non-degreed oriented or technically oriented) depending upon the skills required to meet compliance guidelines adequately.

In the area of resource recovery, Connecticut's legislature has determined that the most intensive involvement will be delegated to the private sector, as state involvement has been explicitly limited from a workforce standpoint. As more and more facilities are called for, design engineers, architects, and operation and maintenance personnel will be most in demand. After 1985, pursuant to final implementation, the workforce will be established and new careers will emanate from attrition and/or further facility construction. Careers in source separation will develop at the municipal level; however, the degree will be determined by local political initiatives.

F. Conclusion

The solid waste program of Connecticut's Department of Environmental Protection appears to have the ability to accept any and all delegations of authority under PL 94-580. The state is currently implementing a comprehensive statewide solid waste program aimed at ensuring environmental health as well as maximum utilization of renewable wastes. A statewide resource recovery authority has been established to implement a resource recovery plan for providing all municipalities with access to such facilities. The program is strictly voluntary and, therefore, it will be forced to operate cost effectively to ensure competitiveness with current sanitary landfill and incinerator operations.

The outlook for careers in solid waste-related fields appears good; however, careers are likely to be restricted to the private sector with only a minimum of growth in the state programs. The following summary prepared by DEP reflects Connecticut's commitment to providing environmentally sound solid waste management services to its citizens.

The state feels that by proper permitting and regulating, it can reduce the problems associated with solid wastes. Technical experts and then inputs are utilized to the fullest extent possible in determining whether or not a solid waste disposal site is meeting the needs of the state properly. The judicious use of monies, both state and local, aids in the generation of total efficiency in solid waste management. The continued formation of regional refuse plans, the appropriation of grant funds to municipalities, and an applied program of hazardous and industrial wastes management all combine to reduce the problems of solid waste management in the state of Connecticut.

VII. WASTE WATER

A. Introduction

The Water Compliance Unit of Connecticut's Department of Environmental Protection (DEP) is responsible for the control of all industrial and municipal water pollution, as well as oil and chemical handling. The Environmental Protection Agency, Region I, awarded the program $825,540 during FY 1976 to support its water pollution abatement effort. The funds are being used to establish and maintain adequate measures for the prevention and control of water pollution through:

1) Planning and Surveillance
2) Enforcement
3) Training
4) Assistance to Local Agencies

DEP's greatest responsibility under the Federal Water Pollution Control Act (FWPCA) PL 92-500, is the Administration of Construction grant funds to the cities and municipalities within the state by authority of the Act. Funding offered under this program currently provides 75 percent of the total cost of constructing municipal waste water treatment plants, interceptor sewers, and pumping stations. The remaining 25 percent is financed by the state and local governments in the form of a 15 percent state match and a 10 percent local contribution.

The Water Compliance Unit has as its goal the attainment of a level of water quality in Connecticut by 1983 that will protect

aquatic life and be clean enough for swimming and other recreational uses. The amendments propose to achieve this goal through a two-phase approach. The first phase, to be completed by July, 1977, requires that industry use the best practicable technology to control pollution and that public treatment plants provide at least secondary treatment. By the completion of the second phase on July 1, 1983, Connecticut industry must use the best available technology, and public facilities must provide the best practicable technology for water pollution control.

FWPCA is administered by EPA and Connecticut through two programs provided by the act, a construction grant program and a discharge permit program. The construction grant program, as previously mentioned, provides funds for the construction of municipal waste water treatment facilities. Prior to awarding community funding to initiate such a facility, the application must be reviewed for design and specifications.

Connecticut had obligated only 51% of available funding under FWPCA one year before the scheduled deadline of September 30, 1977. It has been estimated that the monies obligated so far have created numerous engineering and construction jobs as well as permanent jobs involved in the operation and maintenance (O & M) of these new facilities. With a substantial amount of funding to be obligated within the next year, professionals have judged that additional engineering and construction jobs will be created.

The other major program under FWPCA is the National Pollutant Discharge Elimination System (NPDES), a permit program to regulate the amount of pollutants discharged into the waters. DEP, together with EPA, has the responsibility to set standards for the effluent limitations or the maximum amount of pollutants that can be discharged into a body of water. Sources of this pollution, such as municipal waste treatment plants and industrial plants, must monitor and report on the waste discharged. The State and EPA share the authority for the issuance and enforcement of the permits. During the fiscal year which ended in June of 1975, a total of 302 new orders and permits were issued; 93 were abatement orders, 209 were NPDES Permits. This brought the cumulative total of orders and NPDES permits to 1,867 as of that date.

The areawide waste treatment program is mandated by Section 208 of the Federal Water Pollution Control Act and stresses planning by local Connecticut governments to find and implement solutions to their water quality management problems. Specifically, the information included within an areawide waste treatment management plan identifies the following six major areas of concern in long range water quality planning:

1) Determination of the number of wastewater treatment facilities needed to maintain acceptable water quality over the next 20 years.

2) Identification of the management and functional structure for implementation over this period.

3) Identification and development of a long range methodology for dealing with non-point source pollution.

4) Determination of required long term financial arrangements of the implementing organization(s); time requirements, anticipated costs, and an environmental and economic impact statement on the area designated under the plan.

5) Definition of those methods to be utilized in disposal of sludge and treated water from those plants within its jurisdiction.

B. Workforce Profile

The Wastewater Program of the Connecticut Department of Environmental Protection has the organizational structure shown on the chart following this section.

As mentioned earlier, the mission of the Water Compliance Unit is to control water pollution in every body of water in the state, including ground water, surface water, and Long Island sound. As shown, there exist three primary divisions within the Unit. The first is Planning, Technical Services and Hazardous Materials. This group is charged with all general, basin, areawide, and statewide water quality planning and coordination. In addition, the group is responsible for providing statistical input and evaluation and proper preparation and analysis related to Water Quality Management. Certification of Water Quality within the state is also a function. Further, biological control activities with municipal sewage facilities have resulted in chemical laboratory on-site workshops for plant operating personnel. Currently, samples taken by the group are analyzed by either the State Department of Health Laboratory (if the analysis is considered routine) or by the Chemical Laboratory at Wesleyan University, if the

sample is derived from industrial effluents. Finally, this group also maintains a 24 hour oil and chemical spill response team to react to and coordinate events of this nature.

The Sewage Facilities subgroup is charged with private and public sewage facilities monitoring, surveilance, and construction. This group is also responsible for the state's wastewater treatment plant operator certification program, as well as facilities operation and maintenance technical assistance and inspections.

The third section is the General Water Pollution Control Section. The concept of this working group is unique in that the entire state is divided into four sections. The individual charged with a quarter section must be completely familiar with all water pollution control activities in the area to ensure effective and coordinated implementation of the water pollution control programs in that district.

The staffing level of the Water Compliance Unit is presented in the following table.

TABLE XVII

CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION

Water Compliance Unit
Current (1976) Staffing Level

Position	1976
Administrative	10
Engineer	
Sanitary	29
Intern	1

TABLE XVII
(continued)

Position	1976
Chemist	1
Environmental Analyst	2
Sanitarian	2
Field Inspector	11
Environmental Protection Maintainer	6
Clerk/Typist	14
TOTAL	76

Within Connecticut there are presently 615 certified wastewater treatment facility operators as well as 300 uncertified operators.

C. Workforce Projections

Should they continue, the current fiscal austerity measures of the state will have a substantial effect upon the future size of Connecticut's state wastewater regulatory program. Positions lost by the program through retirement and resignation are relatively few; however, once a position is vacated, it no longer exists and must be justified to the State Administration even if funds supporting the position are federal. To date, the program has been successful in this rejustification process, although obtaining funding for growth is difficult.

Professional turnover is principally the result of engineers finding employment with engineering consulting firms. Generally, individuals who vacate their state jobs for ones in the private sector do so because of the higher salaries available to them there.

Most of the turnover occurs among engineers who have been with the program for four years. Those who stay past the initial four-year period tend to remain on their jobs for an extended length of time. The executive program directors are usually career civil servants who have been with the program from eight to 20 years.

Persons hired to replace turnover are usually recent graduates of graduate engineering programs. State program officials indicate that these new entrants often lack the requisite knowledge and skills for the positions because of disparities between existing graduate curricula and current job demands.

If the fiscal austerity measures of the state do continue and additional monies are not forthcoming from EPA, it appears that little, if any, staff growth will occur over the next five years. Field research suggests that the number of certified municipal wastewater treatment system operators will increase by about 100 per year over the next five years. There are currently 615 certified operators; by 1982 there will be more than 1,100 certified operators. The average per annum rate of growth for certified municipal operators is 13 percent.

D. Training and Certification

Most engineers hired by the program have master's degrees. Those who do not, generally attend graduate courses at the University of Connecticut to secure the degree. No financial support is provided by the state in this endeavor. Occasionally, the wastewater program offers short courses to its employees.

Presently, the subject of toxic wastes is being addressed in this state-sponsored training. All other training for state employees is on-the-job.

Within the state there is considerable interest by the operator workforce in securing continuous training covering operation and maintenance aspects of their facilities. Generally, on-the-job training is utilized along with various short-courses offered by local community colleges. Also utilized is the Sacramento Correspondence Course which offers training in operation and maintenance of wastewater treatment plants and collection systems. EPA funds a six-week program addressing process control techniques for wastewater treatment plant operation.

E. Career Potential

Based on the foregoing, it appears that little career potential exists in the state wastewater program. There will be some job opportunities in the state program for recent engineering graduates, but the high rate of turnover for entry-level engineers suggests that this job is not a long-term career choice for many young engineers. Since state program growth is expected to be minimal over the next five years, career opportunities for persons of all occupations will be quite limited.

The number of municipal wastewater treatment plant operators is expected to increase at an average annual rate of 13 percent or by about 100 operators per year. Accordingly, there will be some career potential for such personnel. In addition, between 50 and 75 vacancies occur annually as a result of turnover, thereby providing continual openings for operational personnel. It should be noted that in terms of salary and

opportunity for advancement, the larger municipalities offer greater career opportunties than the smaller municipalities.

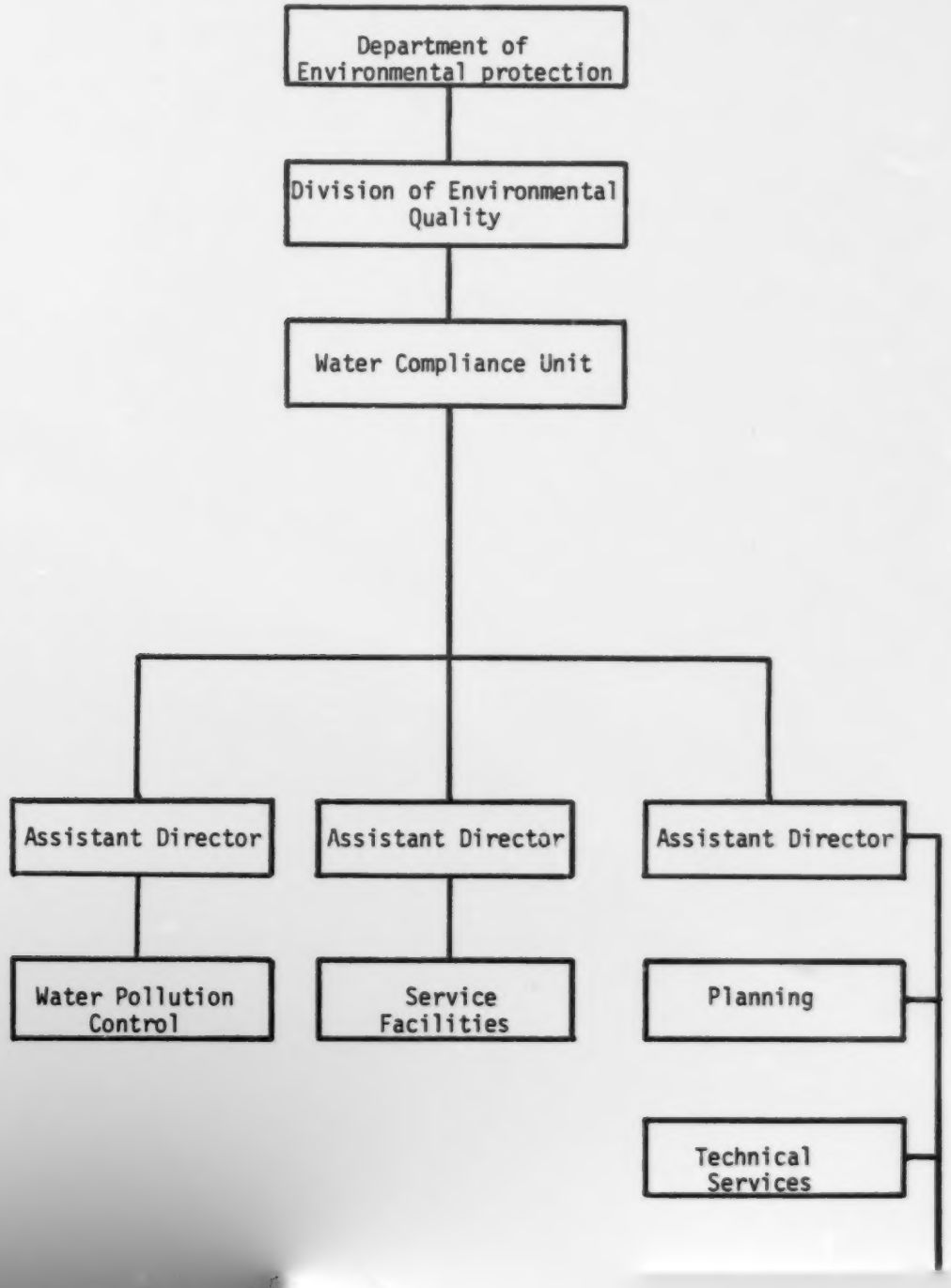
F. Conclusion

The wastewater program in Connecticut's Department of Environmental Protection intends, for the future, to focus primarily on the control of non-point source pollution through an upgrading of "208" designated and non-designated activities and toxic pollutant abatement and control. Also, the state is expected to increase its water quality monitoring and analysis activities, resulting in a substantial upgrading of its ambient water quality monitoring program.

The workforce for the state program has been established and significant growth is not likely to occur because of state and federal funding contraints. Replacement of turnover will continue and recent graduates of engineering schools will be sought for placement with the program.

The workforce of certified treatment plant operators is expected to grow at an average rate of 13 percent per annum as sites within the state are upgraded to secondary and tertiary treatment capabilities.

Figure 4 CONNECTICUT WASTEWATER ORGANIZATIONAL CHART



VIII. ENERGY

Connecticut shares the energy use patterns and problems of the New England region. Per capita energy use is substantially below the national average. This is assumed to be a result of higher energy prices in New England brought about by transportation costs of energy supplies which must be carried greater distances because of the region's dearth of indigenous energy resources. The dependency on oil is nearly twice the national average (85% for New England; 46% for the remainder of the country); natural gas accounts for 9% of the regional energy consumption as opposed to 22% of the national use. New England electric utilities are heavily dependent upon petroleum and nuclear energy for electrical power generation. Approximately 60% of the regional electrical power is petroleum generated; 24% is supplied by nuclear fueled power plants.

Connecticut produces about one-half of the nuclear electrical power generation capacity for the region (2,055 megawatts of 4,204 generated). Nuclear generating units in Connecticut are:

Site	Plant Name	Utility	Capacity (Megawatts)
Haddam Neck	Haddam Neck Generating Station	Connecticut Yankee Atomic Power Company	575
Waterford	Millstone Nuclear Power Station Unit 1	Northeast Nuclear Energy Company	652
Waterford	Millstone Nuclear Power Station Unit 2	Northeast Nuclear Energy Company	828

An additional unit is being constructed by Northeast Nuclear Energy Company at the Waterford site. The Millstone Nuclear Power Station Unit 3 is scheduled for completion in 1982, and is expected to have a generating capacity of 1,156 megawatts.

Future energy needs in Connecticut may be met in part by an increase in refuse derived fuels for electrical generating capacity from operations such as the plant in Bridgeport, Connecticut, which prepares shredded material for use by the United Illuminating Company in the Bridgeport Harbor plant. Twenty percent of the generating capacity is to be derived from waste mixed with oil at a one-to-ten ratio.

Increased coal use is subject to economic difficulties. Much of the available coal is high sulfur content eastern coal. Hauling costs are considerable; scrubber installation costs are prohibitive for many of the older, smaller plants.

Energy conservation must receive priority emphasis in Connecticut for the short and mid-term energy planning efforts. Toward this goal, the Department of Planning and Energy Policy was established in 1975 to replace and expand the responsibilities of the Connecticut Energy Agency and to consolidate those responsibilities with those of the former planning section of the Planning and Budgeting Division of the Department of Finance and Control.

The Department is responsible for energy policy research and development of a statistical support base for population and energy forecasting. Programs and responsibilities include:

1) Development of a long-range energy plan for the state;

2) Analysis of the impact of various proposed national and regional programs in the state;

3) Updating and implementing the state energy emergency plan;

4) Promotion of energy conservation among consumers and within state government;

5) Assisting in the development of the New England Energy Management Information System; and,

6) Administration of the mandatory fuel allocation program.

The Department employed 43 persons in 1976, and is expected to reduce staffing to 37 in 1977.

Selected Post Secondary Institutions With Formal Environmental Energy Programs

There are several colleges and universities in Connecticut which offer programs in environmental science and pollution control technology. Information on these programs was gathered from college catalogs selected on the basis of recommendations by professionals in the field and phone calls to department heads. Only a small percentage of the schools in the state were included in our sample; thus, the programs outlined in this section simply represent the kinds of pollution control training available in the state at the two year, four year, and post graduate college levels. These programs are designed to prepare students for technical or professional positions in pollution control and related areas.

Included in this section are the Hartford Graduate Center, which offers a program in Engineering Science with an emphasis in Environmental Science and Technology, leading to a master of science degree, and Northwestern Connecticut Community College, which offers an associate in science degree in Environmental Technology.

SENIOR INSTITUTIONS

The Hartford Graduate Center
Hartford, Connecticut

Program: Engineering Science with an emphasis in Environmental Science and Technology (M.S.)

Hours required for major: Semester - 30
Program Inception: 1973
Staff Size: Two adjunct professors, seven lecturers in Environmental Science
Enrollment: 25
Graduates (1976): 5
Placement: 5
Graduate Work: not available

Courses

Environmental Management and Society
Environmental Economics and Cost Analysis
Management and Planning for Pollution Abatement
Planet Earth
Special Project
Waste Water Treatment and Disposal
Aquatic Biology and Chemistry
Oceanography
Energy and the Environment
Air Pollution: Sources and Effluents
Water Resources
Air Pollution Control
Atmospheric Physics and Chemistry

COMMUNITY COLLEGES/TECHNICAL INSTITUTIONS

Northwestern Connecticut Community College
Winsted, Connecticut

Program: Environmental Technology (A.S.)

Hours required for major: Semester - 60
Program Inception: 1971
Staff Size: One Professor (1 Ph.D.)
Enrollment: 25-30
Graduates (1976): 7
Placement: Not currently available
Graduate Work: Not currently available

Courses - General and Community Environmental Health Option

Composition and Rhetoric
General Biology
Fundamentals of Chemistry
Environmental Health Seminar I, II
Introduction to Literature
Microbiology
Introductory Environmental Health
Air Pollution
Water Pollution Control I
Food Sanitation
Residential Environment
Planning and Drafting
Solid Waste
Pest Control
Environmental Health Techniques

Courses - Water Hygiene Option

Composition and Rhetoric
General Biology
Fundamentals of Chemistry
Environmental Health Seminar I, II
Introduction to Literature
Microbiology
Introductory Environmental Health
General Chemistry I, II
Water Pollution Control I, II
Hydrology and Soil Science

State Legislation

CONNECTICUT GENERAL

TITLE:

Environmental Policy Act
Connecticut Statutes 22a-1

PURPOSE:

To declare a state environmental policy and provide for the coordination of state environmental policies.

DEFINITIONS:

1. Actions affecting environment

ADMINISTERING AUTHORITY:

Department of Environmental Protection
All State Agencies

AUTHORIZATIONS:

To coordinate state environmental policies and provide for optimal use of resources;
To review agency policies and practices;
To evaluate environmental impact of proposed actions;
To provide comment on environmental impact evaluations.

CONNECTICUT GENERAL

TITLE:

Environmental Protection Act
Connecticut Statutes 22a-2

PURPOSE:

To provide for a means of environmental protection and control, and to create a department of environmental protection.

DEFINITIONS:

1. Commissioner
2. Person
3. Department
4. Disposable package or container
5. Beverage
6. Beverage container
7. Litter
8. Litter bag
9. Litter receptacle
10. Vehicle
11. Watercraft
12. Public place

ADMINISTERING AUTHORITY:

Department of Environmental Protection
Council on Environmental Quality

AUTHORIZATIONS:

To coordinate management of water, land and air resources;
To provide for protection of public forests, parks, coastal resources, plants and wildlife;
To regulate solid waste disposal and practices;
To provide for pest regulation and pollution prevention and abatement;

AUTHORIZATIONS (Cont'd):

To issue regulations pursuant to the act;
To undertake pollution studies and surveys;
To enforce the act;
To adopt a schedule of civil penalties;
To develop a state environmental plan;
To submit annual environmental quality reports;
To coordinate anti-litter programs for the state;
To establish a youth litter corps.

PROHIBITED ACTS:

To discard litter onto any public area or private area not owned by the person;
To violate other state pollution act provisions.

PENALTIES:

Schedule of penalties for other act violations established;
Litter violation - fines of $10 for initial offense and up to $100 for subsequent offenses.

CONNECTICUT AIR

TITLE:

Air Pollution Control Law
Connecticut Statutes 19-505

PURPOSE:

To provide for a program of air pollution prevention and abatement and to delegate responsibility for such purpose.

DEFINITIONS:

1. Air pollution
2. Commissioner
3. Person
4. Municipality

ADMINISTERING AUTHORITY:

Department of Environmental Protection

AUTHORIZATIONS:

To develop a statewide air pollution education program;
To supervise programs for the study of air pollution hazards;
To issue regulations pursuant to the act;
To act as a state lead agency in air pollution matters;
To approve construction of new air contaminant sources;
To issue air pollution emergency orders;
To establish standards for motor vehicle pollution control devices;
To generally enforce the act.

PROHIBITED ACTS:

To violate air pollution regulations through open burning or otherwise;
To violate any emergency order;
To register motor vehicles without effective air pollution control device;
To remove or dismantle any motor vehicle pollution control device;
To fail to obtain construction plan approval or permit;
To violate other act provisions.

EXEMPTIONS:

Total or partial exemptions may be granted by the Commissioner.

PENALTIES:

Open burning violations - fines of up to $1,000 or three months imprisonment;
Emergency order violation - fines of from $250 to $1,000 or six months imprisonment;
Other violations - fines of up to $5,000 per week.

CONNECTICUT NOISE

TITLE:

Noise Pollution Control Act
Connecticut Statutes 22a-67

PURPOSE:

To establish a means for effective coordination of research and activities in noise control and to set noise emission standards.

DEFINITIONS:

1. Commissioner
2. Department
3. Local government
4. Person
5. Noise
6. Ambient noise
7. Stationary noise source

ADMINISTERING AUTHORITY:

Department of Environmental Protection

AUTHORIZATIONS:

To develop a statewide noise regulation program;
To provide technical assistance in noise matters;
To conduct noise surveys and investigate complaints;
To issue regulations pursuant to the act;
To act as the state lead agency in noise matters;
To encourage local noise control.

PROHIBITED ACTS:

To violate any regulations or provisions of the act;
To interfere with the operation of noise control devices.

PENALTIES:

Costs of investigating and abating violation; civil penalties established by regulation.

CONNECTICUT SOLID WASTE

TITLE:

Solid Waste Management Act
Connecticut Statutes 361a

PURPOSE:

To provide for the development of a statewide solid waste management plan and to regulate the transportation and disposal of solid wastes.

DEFINITIONS:

1. Commissioner
2. Department
3. Solid waste
4. Solid waste facility
5. Volume reduction plant
6. Solid waste disposal area
7. Recycling
8. Resource recovery system
9. Municipality
10. Municipal authority
11. Regional authority
12. Region
13. Solid waste management plan
14. Municipal collection
15. Contract collection
16. Solid waste planning region

ADMINISTERING AUTHORITY:

Department of Environmental Protection

AUTHORIZATIONS:

To issue regulations relating to solid waste management;
To undertake demonstration resource recovery projects;
To prepare a solid waste management plan;
To provide solid waste technical assistance to local governmental units;
To act as a state lead agency in solid waste matters;
To approve solid waste facility plans and designs;
To issue guidelines for solid waste facility operators.

CONNECTICUT SOLID WASTE

TITLE:

Solid Waste Management Services Act
Connecticut Statutes 19-524p

PURPOSE:

To maximize resource recovery from solid waste and to promote the recycling and reuse of such resources in order to protect, preserve and enhance the environment of the state.

DEFINITIONS:

1. Authority
2. State solid waste management plan
3. Resources recovery
4. Recycling
5. Person
6. Waste management services
7. Solid waste
8. Solid waste facility
9. Solid waste disposal area
10. Volume reduction plant
11. Resources recovery facility
12. Solid waste planning region
13. Municipality
14. Municipal authority
15. Region
16. Regional authority
17. Bonds
18. Notes
19. Revenues
20. Waste management project
21. Solid waste management system
22. Costs

ADMINISTERING AUTHORITY:

Resources Recovery Authority
Solid Waste Management Council

AUTHORIZATIONS:

To issue regulations pursuant to the act;
To develop short and long range plans relating to resources recovery;

AUTHORIZATIONS (Cont'd):

To construct, operate and maintain waste management projects relating to resource recovery;
To issue contracts to attain the purposes of the act;
To generally encourage the development of volume reduction and resources recovery facilities;
To review and make recommendations concerning solid waste management problems and programs.

CONNECTICUT WASTE WATER

TITLE:

Clean Water Act
Connecticut Statutes 25-54a

PURPOSE:

To control pollution of the waters of the state in order to protect public health, safety and welfare of inhabitants of the state.

DEFINITIONS:

1. Commissioner
2. Waters
3. Wastes
4. Sewage
5. Pollution
6. Rendering unclean or impure
7. Harmful thermal effect
8. Person
9. Community pollution problem
10. Municipality
11. Discharge
12. Pollution abatement facility
13. Disposal system
14. Federal water pollution control act
15. Order to abate pollution

ADMINISTERING AUTHORITY:

Department of Environmental Protection

AUTHORIZATIONS:

To develop a comprehensive plan for water pollution prevention, control and abatement;
To conduct studies and investigations relating to water pollution;
To issue regulations pursuant to the act;
To act as the state lead agency in water pollution matters;
To administer the state pollutant discharge permit program;
To adopt water quality standards;
To establish categories of discharges and effluent limitations;
To supervise any discharge or spillage cleanup operations as feasible;

AUTHORIZATIONS (Cont'd):

To control the use of certain synthetic detergents;
To undertake investigations and enforce the act.

PROHIBITED ACTS:

To cause or allow any water pollution or discharge in violation of act provisions;
To create any substantial new discharges without permit;
To fail to report any oil or petroleum spillage or discharge;
To engage in the collection of waste oil or petroleum without permit;
To sell or offer for sale synthetic detergents containing greater than 8.7 percent phosphorous;
To violate other act provisions or standards.

PENALTIES:

Synthetic detergent violations - fines of from $100 to $300;
Discharge violations - fines of up to $10,000.